The EXCAVATING ENGINEER

Vol. XXIII FEBRUARY 1929 No. 2

IN THIS ISSUE:

Producing Commercial Fertilizer for "The Money Crops" of the World.
Fast Work on Seven Miles of New Perry Highway in Pennsylvania.
Italy Dams Tidone River in Irrigation and Power Project.
Airports Offer New Opportunities for Dirt Movers.
Moving Big Dragline Across the Alama River.

Front Cover Illustration: The Southern Phosphate Corporation use 8-yard electric draglines for stripping and hydraulic guns for mining in their Florida mines. The cut is narrow in this view of their San Gully Mine because the overburden must be rehandled later.

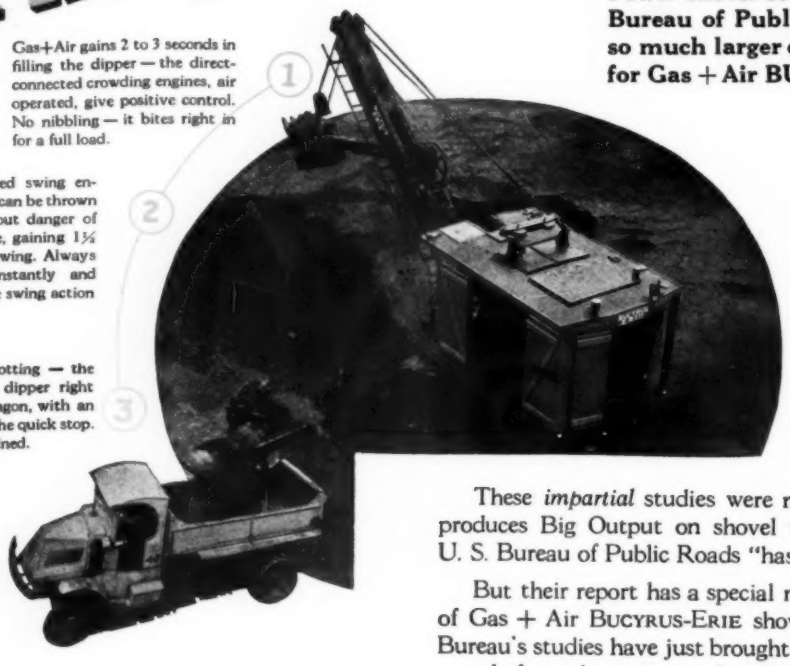
Only 5 seconds per swing—but it's 25% on the day's work!

Power shovel studies, made by U. S. Bureau of Public Roads, show why so much larger outputs are reported for Gas + Air BUCYRUS-ERIES.

Gas+Air gains 2 to 3 seconds in filling the dipper — the direct-connected crowding engines, air operated, give positive control. No nibbling — it bites right in for a full load.

The direct-connected swing engines, air operated, can be thrown in full power without danger of jarring the machine, gaining 1½ to 2 seconds on the swing. Always in gear — start instantly and smoothly — and the swing action is faster.

Quick, positive spotting — the operator spots the dipper right over the truck or wagon, with an air cushion to ease the quick stop. 1 to 1½ seconds gained.



These *impartial* studies were made to find out what produces Big Output on shovel work. Of course, the U. S. Bureau of Public Roads "has no axe to grind"—

But their report has a special meaning for the owners of Gas + Air BUCYRUS-ERIE shovels and cranes. The Bureau's studies have just brought out, more clearly than ever before, the reasons why their Gas + Air machines "dig rings around" other gas shovels and cranes.

Demonstrating that *by shortening the digging cycle just 5 seconds, a 25% increase in output is obtained.*

The Gas + Air gains extra seconds in all three parts of the cycle—

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(2) The direct-connected swing engines, always in gear, permit faster starting — and the swing motion is faster.

(3) Quicker spotting — positive and accurate.

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"Faster—digs more material"—owners everywhere are reporting

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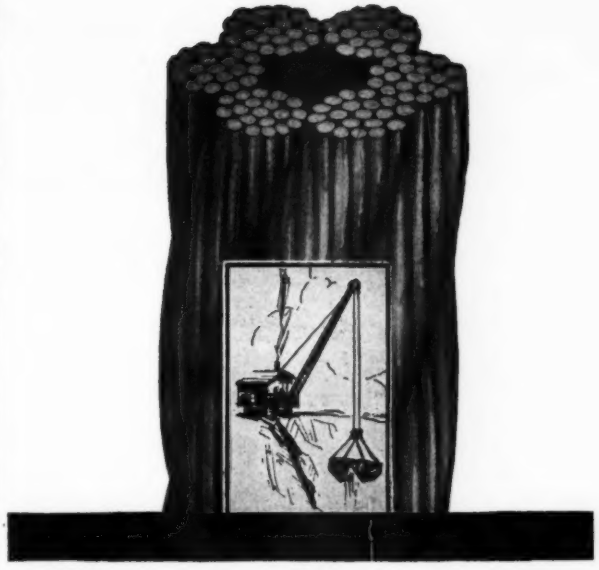

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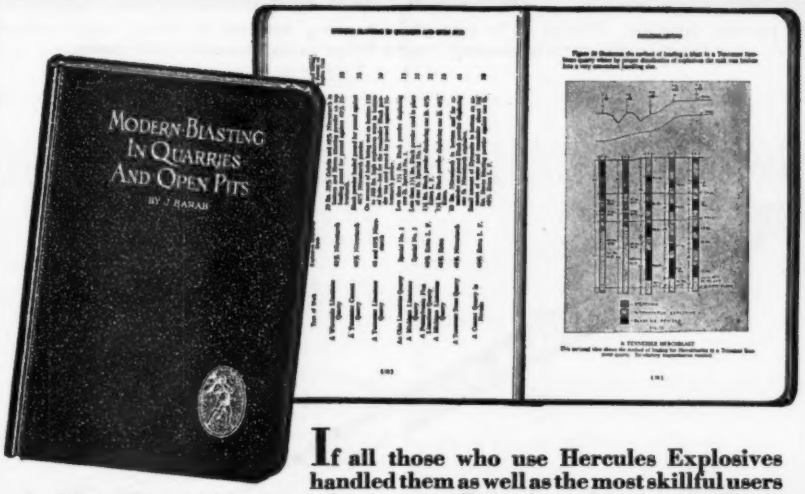

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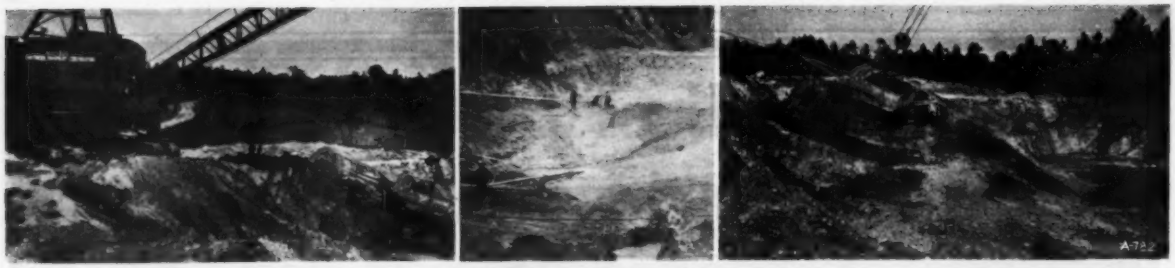
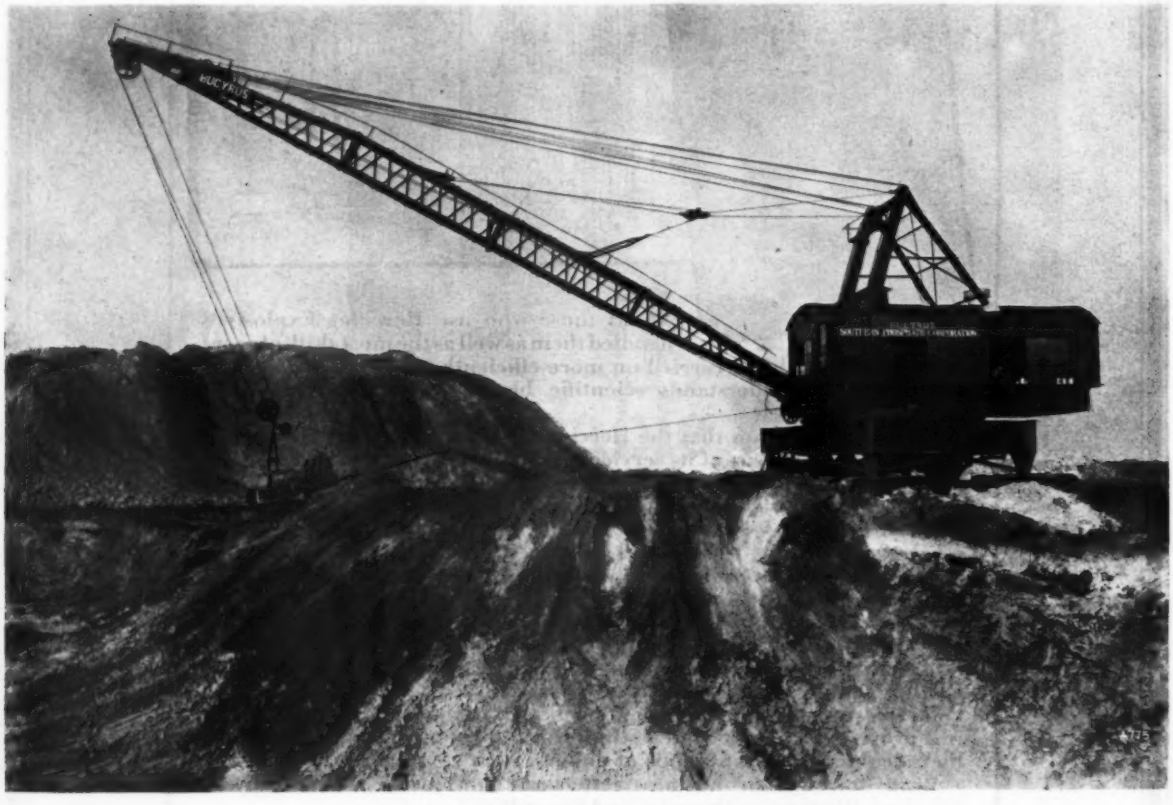


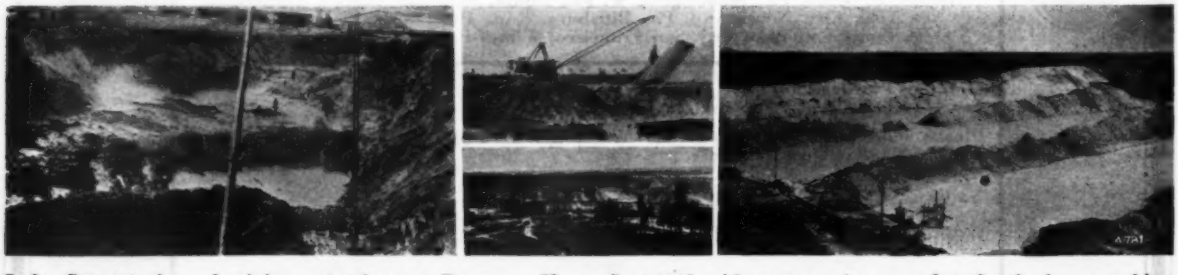
Operations at Pauway Mine.

Left: Stripping with electric dragline. Center: The phosphate-bearing material is mined with hydraulic guns. Right: A full 8 yards in each heaping bucket helps bring the unit costs down.



Bucyrus 320-B Dragline in Operation at Pauway Mine.

Large electric draglines remove the overburden from the Florida phosphate mines of the Southern Phosphate Corporation.



Left: General view of mining operations at Pauway. Upper Center: A wide area can be opened up by the long reaching draglines. Lower Center: Behind the washer at Pauway can be seen the pit operations. Right: A settling basin in mined out areas permits water being used again.

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Producing Commercial Fertilizer for "The Money Crops" of the World

Mining Phosphate in Florida Typical in Operation of Pauway Mine of the Southern Phosphate Corporation.

A MILLION and some odd thousands of years ago in the Pliocene Period of geologic time Mother Nature created a mighty cemetery covering about a thousand square miles in what is now the eastern part of Hillsboro and the western part of Polk Counties, Florida. Here in some marsh, or the bay at the mouth of some mighty river, she buried the countless dead of forest and plain and sea, setting her chemists at work upon a plan of hers.

Today, among the pine woods and palmetto swamps of this cemetery in central and western Florida, a tremendous organization works to enrich the agricultural districts of the world. In 1926 the Florida phosphate mines produced 2,708,207 long tons, over eight and one-half million dollars' worth of phosphate rock, or eighty-four per cent of the total tonnage produced in the United States. Their product is used for commercial fertilizer on the "money crops" not only of this country but in foreign fields as well.

Three classes of the mineral are mined — hard rock, land pebble and soft rock phosphate. The land pebble operators are of principal interest, producing as they do about 95 per cent of the Florida output.

Stripping at the Pauway Mine.

EDITOR'S NOTE: Acknowledgment is made for the excellent co-operation of Chester A. Fulton, Vice-President, H. E. Bowers (now deceased), formerly Assistant Secretary and Treasurer of the Southern Phosphate Corporation and to their associates in furnishing material for the preparation of the article.

Pebble Phosphate Beds 40 Miles Long and 30 Miles Wide

Pebble phosphate consists of rounded or subangular, light gray to blue or black pebbles up to the size of a walnut embedded in a matrix of sand, clay and soft phosphate. Deposits are in beds up to twenty-five feet in thickness, and generally covered by an overburden consisting largely of sand and clay. These beds occur in an oval area approximately forty miles long and thirty miles wide lying east of Tampa. The phosphate content of the marketed product generally ranges from 66 to 79 per cent of tricalcium phosphate.

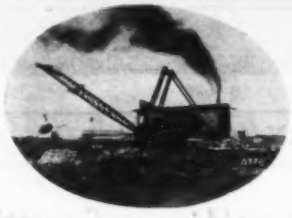
Many fragments of bones and teeth of animals and fish are unearthed in nearly all the mines — the most numerous of these being shark's teeth, while those of the horse, rhinoceros, mantee, and the teeth and tusks of the mastadon are sometimes found.

From River Dredges to Hydraulic Guns

Pebble rock was first mined in Florida by dredging in rivers but this has been discontinued. At present the usual methods of operation is to remove the overburden, either with draglines or hydraulically, and then to mine out the phosphate bearing material or matrix with hydraulic guns. These wash the material down in suspension, and it is then pumped from the pit to the plants with their gigantic multi-stage washers and separators, where

all the waste material, consisting mostly of sand and clay, is scrubbed and screened out of the rock.

The washed phosphate is stored in bins for transportation to the drying plant. There oil-fired drying kilns reduce the moisture content, usually to less than two per cent. Finally the finished phosphate is delivered by conveyors to the dry bins to await shipment.



Back in 1920 the Southern Phosphate Corporation were installing this type of equipment. This Bucyrus Class-24 steam dragline mounted on skids had a 100-foot boom and 3¼-yard bucket.

The hydraulic guns of the Florida mines pump 150,000 gallons of water per minute from reservoirs containing 2,700,000 gallons. They remove 45,000,000 cubic yards of earth per annum. This amount may be better visualized when compared with the 37,116,735 cubic yards moved in the excavation of the Panama Canal in 1908, the greatest amount moved in any one year on the operation.

Mines of the Southern Phosphate Corporation Typical Operations

Among the most efficient of the Florida mines are the operations of the Southern Phosphate Corporation at Pauway and at San Gully, near Lakeland. The Southern Phosphate Corporation is a subsidiary of the Davidson Chemical Company of Baltimore, Maryland.

At these mines the stripping of the overburden is done by two 320-B Bucyrus electric draglines equipped with 8-yard buckets. One dragline has a 125-foot boom while the other and newer equipment has a 135-foot boom. A small Marion machine is used for throwing up dams and ditches.

In stripping, after the first box cut is opened, the overburden is deposited into mined-out cuts, so that the dragline with its long boom and ability to throw the bucket proves an ideal tool for the job. Cuts run 1,000 to 1,600 feet in length, and usually from 175 to 210 feet in width, depending on the depth of the overburden. Very rarely is any blasting required, the dragline cutting the material from the solid bank without trouble.

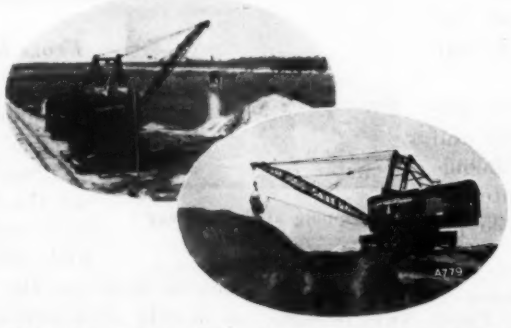
Digging 18,000 Cubic Yards Per Day

The Bucyrus 320-B with its eight-yard bucket moves about 3,000 cubic yards per shift of eight hours. The shovels are in continuous operation, working three shifts per day, each operating with crews consisting of one operator, one oiler and one pitman.

The Southern Phosphate Corporation has had more experience, perhaps, with draglines than any of the other six companies operating in the Florida pebble field. A decade or more ago they were using steam draglines equipped with 3½-yard buckets. About 6 years ago this equipment was scrapped in favor of the Bucyrus 225-B electrically-operated dragline with a six-yard bucket, and a 141-foot boom. This machine was self-propelling and mounted on trucks which ran on mats equipped with 100-pound rails. The mats were laid down by the machine itself when a change of position was desired. This dragline was equipped with alternating current motors of the variable speed type, with the necessary elaborate controlling equipment. The change to this type of dragline effected a saving of 50 per cent in the cost of removing overburden.

About two years ago the company purchased its first Bucyrus 320-B with an eight-yard bucket and 125-foot boom, equipped with a motor-generator set which permits using direct current motors on all hoisting operations, and a material saving was effected in the amount of power used and in maintenance on the electrical equipment. This saving, together with the larger capacity, brought the cost per yard for stripping down an additional 33 per cent.

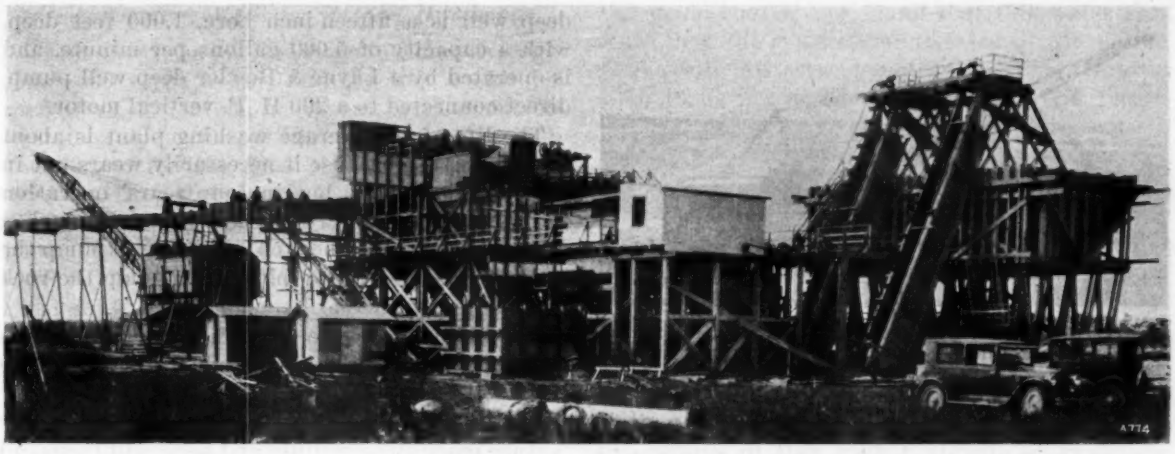
This Bucyrus six-yard electric dragline with 141-foot boom, moving on rail sections mounted on mats, was installed to replace the steam dragline above, and cut the cost of removing overburden fifty per cent.



These big Bucyrus-Erie caterpillar-mounted electric draglines with their eight-cubic-yard buckets have replaced the six-yard machine shown above and decreased unit costs an additional 33 per cent.

Saving in Power Consumption on Direct Current Machines Big Item in Cost Reduction

So great has been the saving when reflected in the cost per ton of phosphate rock, that in 1928 the second 320-B Bucyrus dragline was purchased to replace the 225-B. As a large part of the saving is due to lesser power consumption, the Company now plans to re-equip the



San Gully Washer under construction.

225-B machine with a motor-generator set and direct current hoist motors to be used in another part of their large acreage, to increase production made necessary by demand for phosphate rock.

The Southern Phosphate Company state they find that the caterpillar mounting on the larger

In front of the cats are (left to right) E. A. Pierce, Manager, and Ed. Purcell, Superintendent. Operator Hinton is on the machine.

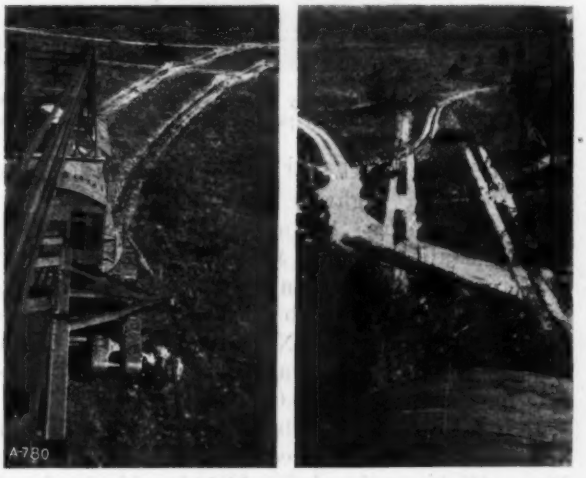
machines (320-B) results in a large saving of both labor and time in moving, resulting in marked economy of operation. These machines, operating with the same size crew, as the 225-B, handle fifty per cent more dirt than their smaller sister though the buckets are only one-third larger. In moving one of the caterpillar equipped shovels to the pit after setting it up it had to travel about a quarter of a mile and made the move in only a few hours.

The electric power for operations is bought from the Tampa Electric Company and is brought into Mulberry from Tampa at 66,000 volts, then transmitted to the mines and drying plant at 33,000 volts, where transformers belonging to Southern Phosphate Corporation drop it to 2300 volts for distribution to the mine pumps and draglines, and at the drying plant to 440 volts for the motors there.

Washing Out the Phosphate

The matrix which contains the phosphate rock is washed from the bank by water shot under 200 pounds pressure from a 1¾-inch nozzle and delivers about 1,300 gallons per minute. From the sump hole the matrix is pumped through a 12-inch pipe line to the top of the washing plant. In the washing process the sand and mud is removed and the wet phosphate rock is delivered to the wet bin at the washer, from which it is loaded into cars of the Atlantic Coast Line for hauling to the driers located at Morris, about fifteen miles away.

The debris from the washers, containing the sand, clay and water, is discharged into troughs,



These pictures, taken at the time the first 320-B was moved in at the Pauway, show the ability of these huge machines to move about on their caterpillar mountings, even when the terrain is comparatively soft.

which carry to mined-out pits and reservoirs. Here it is circulated, the sand and clay settling, and the water, returning by ditches or canals to

Bucyrus-Erie 320-B eight-yard dragline, caterpillar mounted, recently installed at the San Gully Mine.

the hydraulic pump reservoirs, is used over again. Sometimes, particularly in the dry season, it is necessary to operate a deep well to supplement the water returned from the settling basins. The deep well is a fifteen-inch bore, 1,000 feet deep, with a capacity of 5,000 gallons per minute, and is operated by a Layne & Bowler deep well pump, direct connected to a 200 H. P. vertical motor.

The life of the average washing plant is about four years, not because it necessarily wears out in that length of time but in four years' operation the pits work away from the washers to such a distance that it becomes too expensive to pump the water for mining to the pit and to pump the rock back to the washers.

The dried phosphate from the Pauway mine is shipped both by rail and steamer to refresh the tired soil of both domestic and foreign lands.

And so it is that the wise plans which Mother Nature made those million and some odd thousand years ago bear fruit today.

Fast Work on Seven Miles of New Perry Highway in Pennsylvania

By J. W. Fawcett

Paul R. Beals of Buffalo, New York, Averages 1350 Yards per 9-hour Shift Through Some Tough Digging.

Views of the completed Perry Highway grade show a job well done in spite of bad weather and hard digging. In the center picture the Erie B-2 loading an Iron Mule may be seen in the distance.

PAUL R. BEALS of Buffalo, New York, has been in highway construction work for many years. For a long time he was in the firm of Stapell, Mumm & Beals of Buffalo, New York, and last spring started in business for himself. He completed a job of New York State highway construction near Niagara Falls, and did a number of jobs of excavation in and around Buffalo for the Port Huron Cement Company.

Late in 1927 Mr. Beals took on the grading of seven miles of reinforced concrete road on the Perry Highway, involving 51,544 cubic yards of Class 1 and about 500 cubic yards of Class 2. Work was started on January 4, 1928, and completed in 38 working days.

Rain, snow and cold weather held this job back from the start. Some idea of the conditions under which it has gone forward may be gained from the fact that during the first four months it was possible to work only thirty-five full nine-hour days, or about one in three.

It takes more than bad weather, however, to stick the Beals organization.

Gas + Air Shovel Added to Speed Work

At the start, grading equipment consisted of a ⅞-yard Erie Type B-2 steam shovel, three 3½-yard International trucks and a grader. On February 28th a second unit was put to work including three 2-yard Iron Mules, another grader and a 1-yard Bucyrus-Erie Gas + Air shovel.

During the first four months 47,000 yards of material was moved, completing the rough grading on 3½ miles of the job. The material was mostly clay, with several tough places where shale and rock were encountered.

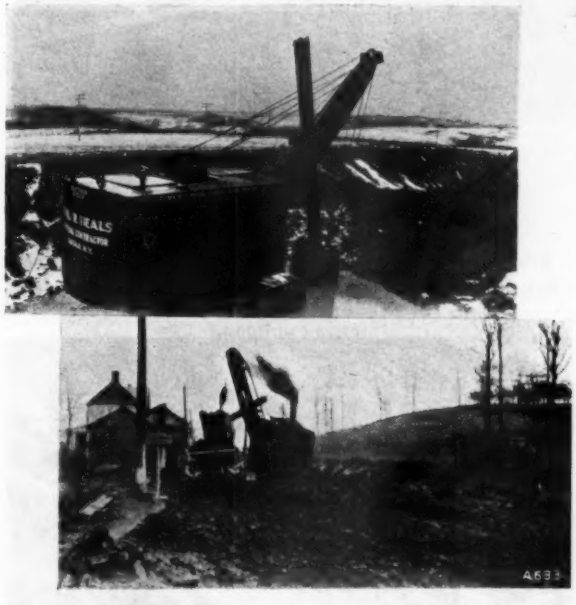
Good Yardage Made in Spite of Handicaps

Throughout the job the steam machine averaged about 600 yards a day, and the Gas + Air 800 yards a day. On one heavy cut, with about 500 feet of haul, the Gas + Air moved 865 yards in nine hours, loading into 3½-yard International trucks. Mr. Beals reports his savings amount to $20.00 per day by using the Gas + Air instead of steam. This includes $4.00 for night-watchman, $6.00 for fireman and $10.00 for cost of team and water tank. Gas consumption amounts to about 45 gallons per day for 10 hours. In digging shale rock this machine has dug as high as 885 yards truck measure.

Much of the time lost on this job was because the trucks could not handle their loads on account of mud. Mr. Beals tried an interesting experiment using one-yard trucks against 3½-yard trucks. He found that while it was possible to use the smaller trucks at times when the large ones were out of the question so much dirt was spilled in loading into the smaller trucks that this proved to be more expensive than waiting for suitable weather for the larger trucks.

Water for Steam Shovel Cost More than Gasoline for Gas Machine

Another difficulty was that of getting fuel to the shovels. Two teams of horses on a wagon with two tons of coal were unable to get out to the steam shovel on many occasions. For this reason the Gas + Air worked when the steam machine was idle. Mr. Beals had, in addition, to haul water to the steam shovel, and found that this water cost more than the gasoline for the Gas + Air shovel.



The 1-yard Gas + Air (above) averaged 800 yards a day throughout the job and the B-2 (lower picture) handled about 600 yards a day.

Yet with all these handicaps he has averaged 1350 yards per nine-hour working day, a record for any contractor to shoot at. Mr. Beals says he is confident that with good weather he could knock out 1000 yards a day with the Gas + Air. And on one job in Buffalo last summer, excavating for the new plant of the Port Huron Cement Co., the Type B-2 steam shovel moved 9500 yards in eleven 10-hour days, an average of 870 yards in 10 hours, and during this record period the shovel was operated by Jack Prefontaine.

There was practically no time out for the shovels through the entire job.

Iron Mules serve the B-2 Erie. Wehr One-Man Power Grader was close behind the shovel and came over to get into the picture.

On the Perry job Clarence Beals is foreman on the Gas + Air, and A. Johnson is fanning the levers. H. Stewart, who has been bossing dirt-moving jobs for a generation, is foreman on the Type B-2 steam shovel. Logan Rodney is running the shovel, and E. W. Zehner is keeping up steam. B. J. McMahon keeps track of the bad weather and time on the job.

Experiments in the flotation of high-silica bauxite, being conducted by the United States Bureau of Mines, Department of Commerce, at its Southern Experiment Station, Tuscaloosa, Alabama, have indicated that sodium sulphide is the most effective reagent for conditioning the pulp.

And Perhaps He Was Scotch

Frank: "What did you do with the blonde you had out last night?"

Ernie: "Oh, I gave her the air. She turned out to be one of those Iowa girls."

Frank: "What do you mean, 'Iowa girls'?"

Ernie: "You know — I owe a month's rent, etc."

Suspicious Husband: "Who called this afternoon?"

His Better Half: "Only Aunt Sophie."

S. H.: "Well, she left her pipe."

Italy Dams Tidone River in Irrigation and Power Project

Riccardo Fillippa, Contractor, Handles Excavation and Construction with Greatest Efficiency.

Bird's-eye view of the Tidone Dam from the left bank, showing the Dam practically completed.

THE outstanding Italian construction project of the year 1928 was the damming of the Tidone Valley near Molate, west of Nibbiane and Piacenza, and was carried out by contractor Riccardo Fillipa of Turin, Italy. The work consisted of a dam across the Tidone River, creating an artificial lake of 3,302,125,000 gallons, (12,500,000 c. m.) capacity.

The principal aim behind this project is the irrigation of 9,884 acres of land, by means of a net of canals totalling 143 miles in length. Water is also supplied to two generating plants capable of about 25 million kilowatts per year. The work was planned and directed by A. Ballerio, engineer.

The dam is of the American multi-arcade type of reinforced concrete and based on pillars. It has a maximum height of 184 feet and a width of 295 feet at the base, tapered down to 262 feet on the river bed. The thickness of the wall at the top is approximately 16½ feet.

Excavation Totals 255,000 Cubic Yards

The importance of good foundations for the solidity of dams was given careful consideration.

Ingersoll-Rand equipment was used to drill holes in the bed rock in which the reinforcing rods for the pillars were cemented.

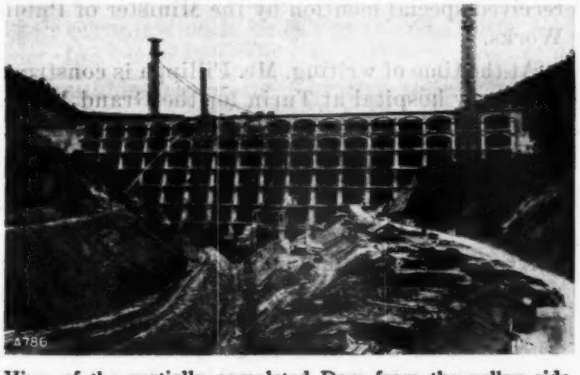
Digging and dredging began in the Spring of 1925, and the total volume of dirt, gravel and rock excavated amounted to over 255,000 cubic yards. Excavation for the foundations was handled by a Bucyrus caterpillar-mounted, ¾-yard steam shovel. The same shovel was used for the foundation of the water unloader, where it dug in water excavating mixed earth and findings of sandstone and debris. This was very difficult ground to work in because of the presence of water, but good results were obtained in every case.

After the overburden was removed the solid rock of the bed and banks was washed with streams of water, then rods were stuck and cemented in drilled holes, over which was poured the concrete of the pillars. For the rock drilling Ingersoll-Rand compressed air units were used.

196,200 Cubic Yards of Excavated Material Used for Aggregate

From foundations of the dam 196,200 cubic yards of material was sent through a washing and crushing plant, where it was prepared for use as concrete aggregate. 160,884 cubic yards of concrete were required to build the dam.

In excavating material for aggregate the Bucyrus shovel loaded into small cars hauled by an elec-

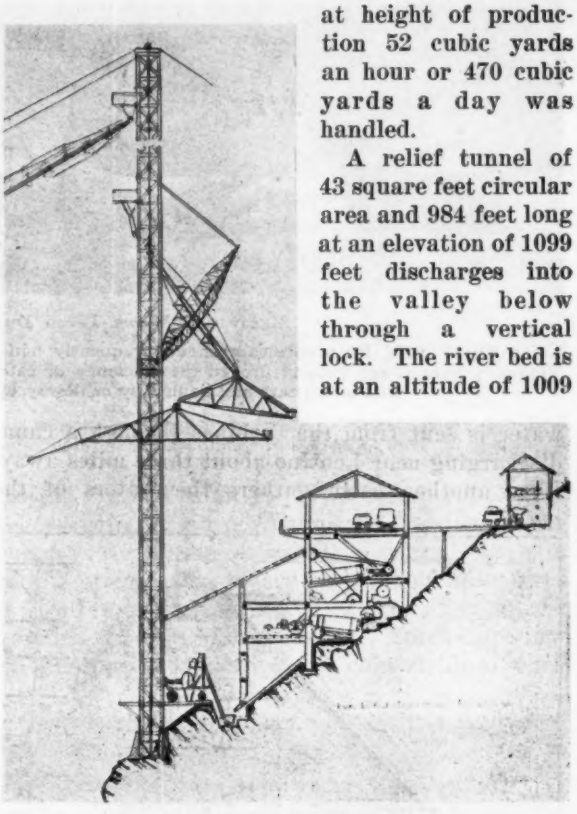


View of the partially completed Dam from the valley side, showing the connecting arches and the concrete pouring system.

tric motor up an incline about 656 feet in length, climbing from an altitude of 1037 feet to 1162 feet. The material was dumped, sorted, and the larger sizes sent to the crushing plant while the smaller gravel and sand went into washers where it was thoroughly cleaned. By means of chutes the crushed and cleaned aggregate was delivered to the mixing drums.

The cement, produced in a plant nearby, was sent across the valley to the mixers over a wire conveyor 984 feet long with an inclination of 11 per cent. The mixed concrete was sent to a reserve tank feeding the elevator scoops conveying to the tower tank which supplied the pouring chutes. This installation was of the Lakewood type, and at height of production 52 cubic yards an hour or 470 cubic yards a day was handled.

A relief tunnel of 43 square feet circular area and 984 feet long at an elevation of 1099 feet discharges into the valley below through a vertical lock. The river bed is at an altitude of 1009



Sketch of Mr. Fillipa's very efficient plant for production and distribution of concrete.

feet, the maximum water level will be at 1179 feet, and the walk on the dam is 1187 feet.

Electric Plant Embodied in Dam

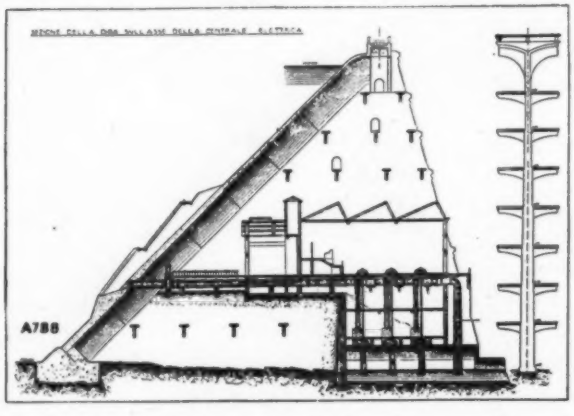
Embodied in the dam near the left bank is one of the electric plants with its water intake. The power is developed by three generators, totalling 2500 horse power. From the dam power plant the

R. Fillippa, in his excavation for the Dam, used his Bucyrus ¾-yard steam shovel.

Excavation Views Taken During the Tidone Dam Construction.

Left: The ¾-yard Bucyrus steam shovel frequently had to work in water and in this case was caught in a flood. Center: Traveling over rough ground proved the efficiency of caterpillar mountings. Right: Aggregate for the concrete was loaded into small cars and hauled by cableway up the incline railway shown in this illustration.

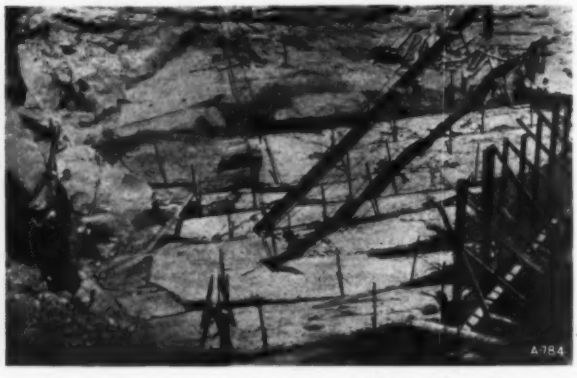
water is sent from the turbines through a canal discharging near Lentino about three miles away. Here another basin gathers the waters of the



Cross section of the Dam, showing electric generating plant.

Tidoncello which flows into the Tidone at Nibbiareo. The water of this basin is tunnelled into a loading basin near Pianello, where a second electric plant is located and discharges into the main irrigation canal.

Included in the plant were a shop for repairs, a saw mill, a carpenter's shop and a battery charging unit for the electric engines in service. To lodge the workmen, who were 450 at the peak of the work, and about 280 for the remaining period, a special camp was erected with single rooms and also double rooms to accommodate the married couples. A telephone board was installed on the wharf, and electric light was also furnished by means of four Ganz transformers.



Pouring the concrete for the base of pillars after the overburden has been carefully cleaned from the bed rock.

Excellence of Mr. Fillippa's Work Earns Special Mention by Minister of Public Works

Riccardo Fillippa conducted the construction operations so efficiently and well that his work has received special mention by the Minister of Public Works.

At the time of writing, Mr. Fillippa is constructing a new hospital at Turin for the Grand Master of the Maurician Order at Turin and using his Bucyrus shovel for excavating the foundations.

Utilize Waste Sand for Making Brick

After 50 years and more of persistent effort, says *The Stone Trades Journal,* a use has been found for the waste sands of St. Helens, England. These sands, of which large quantities are employed there for glass polishing, have been accumulating to such an extent in past years that the town is dotted with numerous unsightly piles of this refuse from the glass plants.

Now, after fortunes have been lost in past attempts to solve the problem, two men of St. Helens, Peter Heaton and Horace Pardoe, claim that the sand is suitable for the making of brick that are in every way equal to ordinary clay brick. According to the inventors, who have worked on the problem for almost 10 years:

"The bricks already produced have been tried by fire and water without revealing crack or flaw. They have been boiled in sulphuric acid for nearly a week, and then for several days in soda. Any brick that can stand tests like that is as good as anything on the market."

Airports Offer New Opportunities for Dirt Movers

Nello L. Teer of Durham, North Carolina, Moves 112,000 Cubic Yards in Grading Runways for Charlotte, North Carolina, Airports

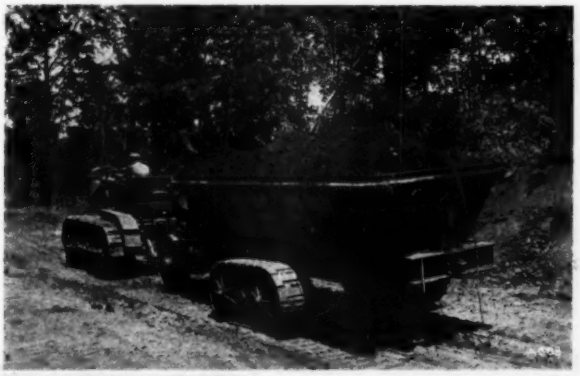
Left: Caterpillar Sixties draw 10-cubic-yard crawler-tread dump wagons in two wagon trains. Center: These two Erie Gas + Air Shovels were making the dirt fly. Right: Best 60 with bull-dozer attachment was used to level off the dump.

EVER since the lone flight of Lindbergh across the Atlantic and the subsequent successes of other aviators in spanning great expanses of water over which airplanes had not hitherto traversed, Charlotte, North Carolina, has wanted a first-class airport. When provision for a municipal airport seemed to be too long in passing the city government, and seeing the immediate need for a local airport, a group of the leading local business men decided to underwrite the construction of an airport themselves. Their organization is known as the Charlotte Airport, Inc.

Reputable aeronautic engineers were employed to design an A-1 airport. Plans were prepared and construction began in the summer. The plans call for the immediate construction of two runways, each half a mile long, and crossing at right angles to each other. Future construction will provide for two additional runways in the shape of a "T" superimposed on the "X" being built now. These runways are 300 feet wide with all obstructions removed to a total width of 500 feet. Hangars, stations, etc., are being built alongside the runways. Water, sewers and electricity are being installed and auto parking space is being provided.

Two Erie Gas + Air Shovels and One Northwest Speed Completion of the Job

As there were 112,000 cubic yards of excavation in the present program of construction, grading was one of the big items. Nello L. Teer, of Durham, North Carolina, was awarded the contract for the grading. His outfit included two Erie Gas + Air shovels, and one Northwest part of the time, a fleet of mule-drawn wagons, dump trucks, and crawler-tread Western dump wagons pulled by "60" Caterpillar tractors. Another tractor with bull-dozer attachment spread the dumped material in even layers. A road machine was used for the finished leveling. The final operation was the dragging of an ordinary steel T-rail over the runways to obtain a smooth surface. Rods a couple of feet long placed in the bolt holes kept the rail upright, leaving a cutting edge on the ground. L. J. Jordan, Charlotte, North Carolina, was engineer in charge of construction, with George Johnson having charge of the work for the contractor. The entire job was completed in 60 working days of 12-hour shifts, practically the entire yardage being handled by the Gas + Air machines, the Northwest only being used a few days, having been moved in from another job.



Here is a picture from another of Mr. Teer's jobs on a state highway near Graham, North Carolina. The Caterpillar 60 is hauling a "single" this trip but the Biehl Creeper dump wagon carries a real load.

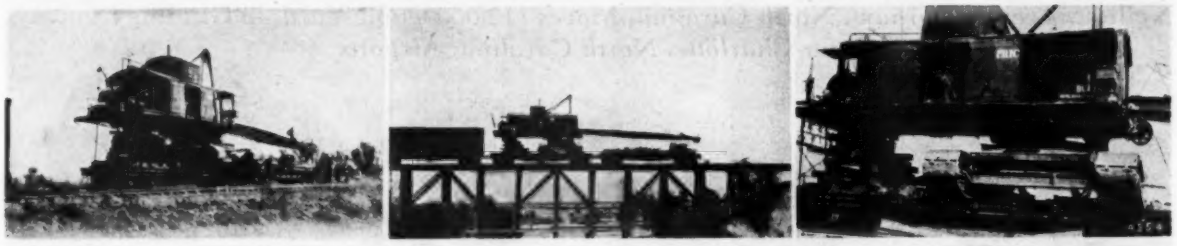
It Happens Every Day

A careful contractor bidding in competition with a bunch of fly-by-nighters, rushed into an architect's office to explain that he had forgotten to send in all his bid.

"The bid I sent in didn't include the brick work, plastering and cement work," he explained, excitedly.

"Oh, that's all right," said the architect, "you weren't low anyway!"

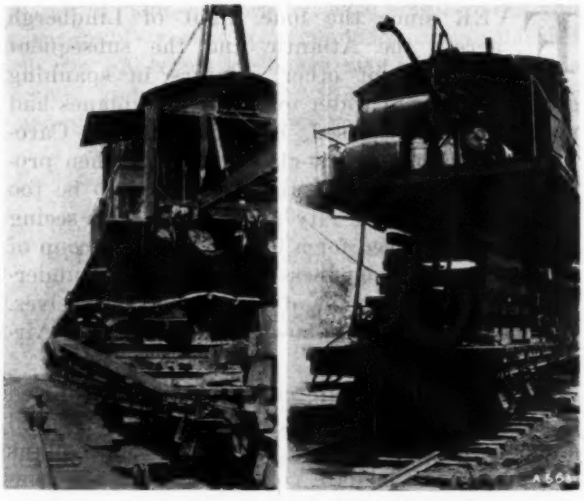
Moving Big Dragline Across the Alama River



Crossing the Alama River in California. Left — Machine Loaded and Blocked, Ready to Go. Center — On the Way Over the Railroad Bridge. Right — Showing Method of Blocking to Prevent Machine from Moving in Transit.

When it became necessary to move one of the Bucyrus Class-9½ draglines across the Alama River to Holtville, California, the Imperial Irrigation District found that there were no bridges on the river strong enough to hold the weight of the dragline with the exception of the railroad bridge. In order to save the expense and delay involved in dismantling the machine, the dragline was run up on a flat car over an approach of timbers built up on the ground. After being thoroughly blocked the boom was lowered over a second flat car, which carried the bucket together with the blocking used in loading the machine. The dragline was then hauled across the railroad bridge and unloaded at Holtville. The distance moved on the railroad was about five miles, and the trip required about an hour as the train had to move very slowly. Loading required approximately five hours, and another five hours was consumed in unloading.

The move is an interesting one but, as operator Hartzell says, "It was risky business" and *The Excavating Engineer* does not recommend this method of handling of equipment of this size. The move was in charge of A. R. Groves, master mechanic for the Imperial Irrigation District of Imperial, California, assisted by assistant J. R. Southworth. C. F. Hartzell, who has been operating draglines for the Imperial Irrigation District since 1922, handled the machine. It is through Mr. Hartzell's courtesy that we have received the photographs which are used for the illustrations.



The Above Picture Shows Method Used in Blocking the Bucyrus Class-9½ Dragline for the Move.

Pointers on Firing for the Steam Shovel Operator

One of a Series of Articles on the Operation and Maintenance of Excavating Equipment

By Fred. J. Brewer, *Superintendent of Outside Construction, Bucyrus-Erie Co.*

When coal or wood is applied to the fire, the volatile or gaseous matter is expelled, and if properly mixed with air and heated to a sufficient temperature in the firebox, the mixture will ignite, be consumed and pass from the firebox through the tubes and stack as a colorless vapor, leaving the solid matter on the grates in the form of coke, which burns more slowly. If the gases are unconsumed, they will produce smoke. In order to keep sufficient temperature and air to ignite the gases, the fuel should be applied in thin layers thus allowing space for live fire. Green wood contains a large amount of water which must be evaporated. This vapor cools the temperature of the burning gases, therefore the wood must be burned in a deep fire.

As soon as a few pounds of steam are available, the blower may be used to create additional draft when building up a new fire. The fire door should be placed against the latch and not left wide open during the intervals when the fireman obtains his second, third or more shovelfuls of coal or other fuel; this gives an opening for the entrance of sufficient air to mix with the volatile gases and insure their consumption, eliminating black smoke. Experimentation

alone will determine how long, after the last shovelful, the door should be left this way. Generally this is only a few seconds.

No hard and fast rule covering the depth of the fuel in the fuelbox can be made. Good judgment must be used, as conditions under which the machine is operated and the kind of fuel burned largely determines this. Large pieces of fuel do not make a satisfactory fire but fuel should be broken up before it is thrown into the firebox.

Always fire as light and as level as possible consistent with steam requirements; scattering the fuel over parts where the bed is thinnest and the fire brightest prevents it from becoming dead in spots. Large quantities of fuel placed in the firebox at one time cools down the fire, causes smoke and wastes fuel. Small quantities at regular intervals keeps the fire bright, reduces smoke and takes less fuel to keep up steam pressure, resulting in a reduction in the work of firing.

Heavy or uneven firing is apt to cause the boiler tubes and flue sheets to leak and may cause the firebox sheets to crack. As air cannot pass readily through a heavy fire, cold air will be drawn through the thinnest places in the fire and possibly the fire door, resulting in chilling the flues and sheets, the formation of smoke, and a reduction in steam pressure.

The smokebox, its door and the stack should fit tight. Care should be taken to prevent holes rusting through the smokebox and stack. If smokebox or stack have holes in them so that air leaks, it will allow the gases to cool and thereby decrease the draft. This condition often causes a poor steaming boiler and is one which should and can easily be remedied.

The fire should be shaken or cleaned only when necessary to clear it of ash and clinker in order to admit sufficient air for proper combustion. Shaking or cleaning should be done carefully to avoid the loss of a good fire. The grates should be placed, after each shaking or cleaning, in a level position, to avoid burning the fingers, which will occur if the grates are allowed to remain at an angle with the fingers projecting into the fire.

The exhaust nozzle in the stack of forced draft boiler should be located in the center of the stack so that the exhaust strikes evenly the sides of the round part of the stack, otherwise the boiler will not steam properly.

Waste of steam through safety valves should be avoided. Frequent blowing off of safety valves indicates poor firing and economy is not being practiced.

Fuel can be saved by the proper use of the injector, by feeding the boiler regularly at a rate governed by the demand, and by taking advantage of every opportunity to increase the height of water level when not working the machine to full capacity.

The water level should never be high enough to allow water or very moist steam to be carried through the steam pipes, valve chambers and cylinders, because it will carry off the lubricant for these parts, and may result in serious damage, due to knocking out cylinder heads, breaking pistons or bending the connecting rods of the engine.

When banking or cleaning fires, the blower should be used as little as possible, to avoid rapid cooling of the firebox and flues, which may cause leaks.

When cleaning fires, or with a banked fire, the excessive use of the injectors must be avoided as the introduction of an excessive amount of water at such times will result in injury to the flues because of rapid reduction of temperature of the water in the boiler producing contraction without sufficient heat in the firebox to counteract this effect.

After the fire has been cleaned of ash and clinker, the clean fire should be placed at the flue end of the firebox, in case of locomotive-type boilers, or spread evenly over the grates in vertical fire tube boilers and maintained in good condition by applying small quantities of fuel as may be required to prevent cold air from passing through the flue end of grates and injuring the flues.

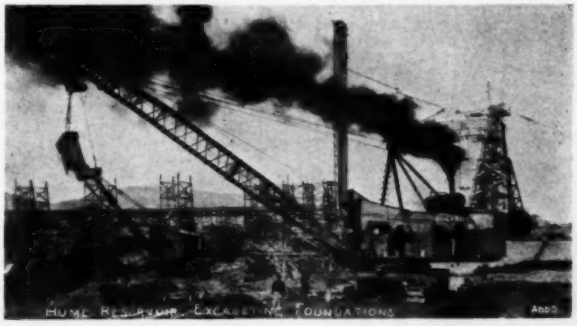
Do not open the fire door too soon after banking a fire as the cold draft will damage the tubes. Twenty minutes at least should pass after banking the fire before opening the door. Always close the draft doors when you want a banked fire to last over night.

Almost any fire can be clinkered by stirring it up with a hook so that green coal gets down on the grates. A fire can also be clinkered by shaking the grates so hard that green coal works its way down through the fire. With certain classes of coal, heavy firing, which causes banks to form in some portions of the fire, will start clinkers. When a clinker has formed in a firebox it can sometimes be broken by shaking the grates with short, quick jerks, but as a general rule the fire must be cleaned to get rid of it. Trouble due to clinkered fires can be materially reduced by not shaking the grates so hard, not using the hook or slice bar so often, and by careful firing to prevent the formation of holes in the fire.

Finish the Job

"How's this," asked the lawyer, "you've named six merchants in your will to be pall-bearers. Wouldn't you rather choose some of your friends with whom you are on better terms?"

"No, Judge, that's all right. Those fellows have carried me so long that they might as well finish the job." — *Eagle Quills.*



Excavating for the foundation of the Hume Reservoir in New South Wales, Australia, we find the above Bucyrus Class-14 dragline. The machine is being operated by the Public Works Department of New South Wales.

The Excavating Engineer

A Monthly Publication Devoted to Excavating and Allied Subjects

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The Business Situation

It is interesting in reviewing the reports of business for 1928 to note that industrial net profits showed a remarkable gain over 1927 in spite of narrowing margins of profits and the keenest of competition. This favorable condition of industry has been brought about largely by increased efficiency of mechanical equipment and industrial management. The lesson to be learned regarding the importance of taking advantage of modern cost, reducing machinery and labor-saving equipment, is one that should be considered carefully by every division of industry.

That the present situation has very favorable indications for our own industry, seems to be the general consensus of opinion prevalent at the great gatherings of the month in Cleveland, the National Sand and Gravel Association, the American Road Builders' and the National Crushed Stone Association conventions. The general feeling of optimism and anticipation of good business during the coming year seem to be general among visitors from all parts of the country.

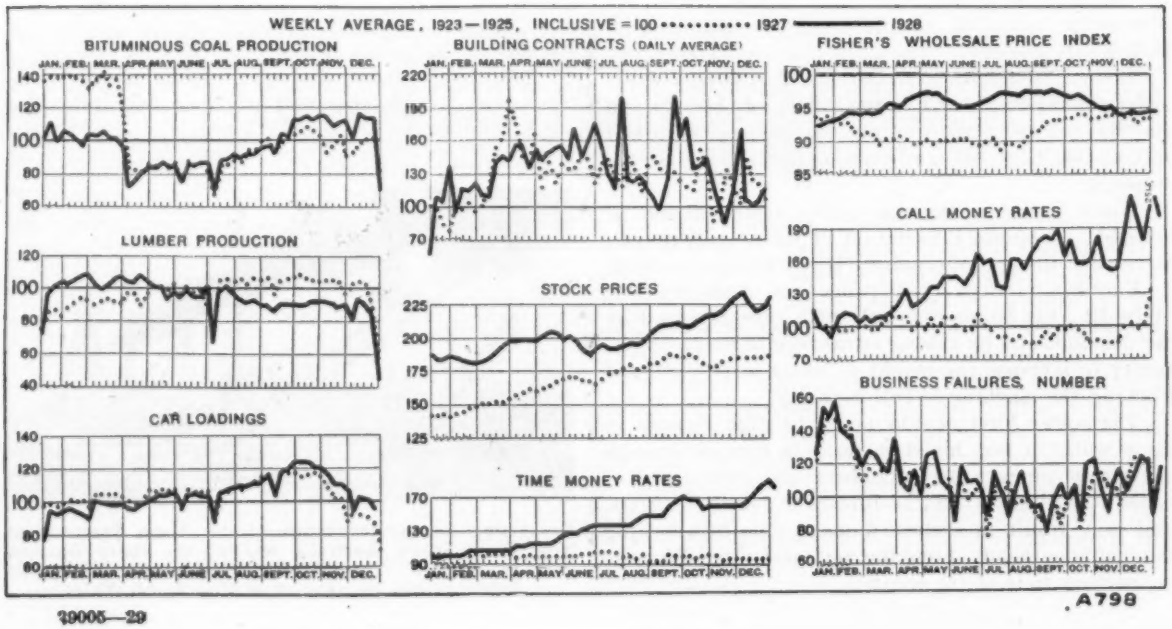
In a statement issued recently F. A. Merrick, Vice-President and General Manager of the Westinghouse Electric and Manufacturing Company, predicts a progressive improvement in business. The election of Mr. Hoover, well known and proven in his understanding of national and international affairs and in his capacity for getting things done without needless turmoil, has been an important factor in giving encouragement for the stability in the business world. His course of action in these months following his election has done much to confirm the field of excavation in its especially favorable outlook for his coming administration.

The 1928 construction volume was the highest in the history of the country, according to F. W. Dodge Corporation. Contracts let on new building and engineering work in the 37 states east of the Rocky Mountains during the past year reached a total of $6,628,286,100. This figure was 5 per cent ahead of the total for the year 1927 and it was 4 per cent in excess of the total for 1926. The previous high record had been held by 1926. The territory covered in the 37 Eastern States represents about 91 per cent of the country's total construction.

There was $432,756,300 worth of contracts let on new construction work during December. The above figure was 8 per cent below the total for November 1928 and there was a drop of 9 per cent from the December 1927 record. Analysis of last month's contract record showed the following important classes of work: $178,323,100, or 41 per cent of all construction, for residential buildings; $80,194,000, or 19 per cent for public works and utilities; $66,772,600, or 16 per cent, for commercial buildings; and $38,247,900, or 9 per cent, for industrial projects.

Contemplated new work was reported in this territory to the amount of $725,178,800 during December. This figure shows a drop of 22 per cent from the amount reported during the preceding month and there was a loss of 27 per cent from the amount reported during the month of December 1927.

WEEKLY BUSINESS INDICATORS


WEEKLY AVERAGE, 1923—1925, INCLUSIVE = 100 ····· 1927 ——— 1928
BITUMINOUS COAL PRODUCTION
BUILDING CONTRACTS (DAILY AVERAGE)
FISHER'S WHOLESALE PRICE INDEX
LUMBER PRODUCTION
STOCK PRICES
CALL MONEY RATES
CAR LOADINGS
TIME MONEY RATES
BUSINESS FAILURES, NUMBER
JAN. FEB. MAR. APR. MAY JUNE JUL. AUG. SEPT. OCT. NOV. DEC.
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The business weather map published by The Magazine of Business, indicates that the average conditions for January will be maintained at a high level. Increasing problems born of severe competition in all fields is stressed as never before with the turn of the year and the continued advances in stock market trends is considered a factor most unfavorable to the condition of current business conditions. Many fear a breakdown which would cause a financial unsettlement. Such an event would have a wide-spread effect, difficult to forecast because of the country-wide entry into the market of people of moderate means.

Agricultural conditions are favorable and the farmer sees definite hope of steps toward a solution of his problems early in the Hoover term.

The total value of mineral production in the United States in 1928 was approximately $5,400,000,000, as estimated by the United States Bureau of Mines, Department of Commerce. This is a decrease of approximately 2 per cent of the total value of mineral products in 1927 and is due almost entirely to a decrease in the total value of mineral fuels. Of these, the quantity and value of coal decreased; the quantity of petroleum produced changed little, but the value decreased, and the quantity and value of natural gas and natural gasoline increased as compared with 1927. The total value of metallic products shows an increase due to increase in quantity and unit value of copper and an increase in the quantity of iron produced. Decreases were shown for gold, silver, lead, and zinc. The total value of non-metallic mineral products shows approximately no change.

"Have you no chivalry?" demanded the indignant female. "No, ma'am," replied the insulting male, "I traded it in on a Chrysler."

American Ceramic and National Construction Expositions at Chicago During February

In Chicago, February 4th to 9th, at the Hotel Stevens, will be held the American Ceramic Exposition in connection with the convention of the American Manufacturers of various Ceramic and Clay Products Associations.

Also in Chicago, February 18th to 23rd, will be held the National Construction Exposition in conjunction with the annual meeting of the American General Contractors of America at the Builders Building.

American Institute of Mining and Metallurgical Engineers to Hold Annual Meeting

On February 18th to 22nd, the American Institute of Mining and Metallurgical Engineers hold their annual meeting in New York City. This meeting is an outstanding event in the year for the mining industry. Engineers, operating men, executives, gather once a year at Institute headquarters to discuss new technical processes and new methods of cost reduction in the mine, mill and smelter.

National Paving Brick Manufacturers Meet February 13, 14, 15

The twenty-third Annual Meeting of the National Paving Brick Manufacturers Association will be held at the Mayflower Hotel, Washington, D. C., February 13, 14 and 15, 1929. The program for the first two days will include papers and discussions of the latest practices in the designs and construction of streets and highways and are open to the general public. There will be a banquet Thursday night, February 14, and the regular business session will be held on the last day of the meeting.

At the Cleveland Conventions

Sand and Gravel — January 9, 10, 11

With the Hotel Hollenden Ball Room given over to the exhibits of fifty-six equipment manufacturers, the National Sand and Gravel Association held their thirteenth annual convention at Cleveland on January 9th, 10th and 11th. The meeting was very well

National Sand and Gravel Association Annual Banquet at Hotel Hollenden, Cleveland, Ohio, January 10, 1929.

attended despite many last minute cancellations of reservations.

One of the convention highlights was a paper on Ready Mixed Concrete by Norman Beggs of the Portland Cement Association. This gave an excellent summary of present experience and possibilities of central mixing plants.

Officers elected for 1929 are as follows: President, R. C. Fletcher, Flint Crushed Gravel Co.; Vice-President, F. D. Coppock, American Aggregates Corporation; Secretary-Treasurer, H. S. Davison, J. K. Davison & Bro.; Executive Committee, R. S. Potts, Potts-Moore Gravel Co., J. C. Buckbee, Northern Gravel Co., H. V. Owens, Boonville Sand Co., F. W. Peck, Mancie Sand Co.; Directors at Large, H. V. Owens, F. W. Peck, Fred Hall, Ohio River Sand & Gravel Co.

Operating men of the sand and gravel industry will do well to plan on attending the next annual meeting in January 1930.

Road Builders' Convention and Road Show, January 14th to 18th Inclusive

January 14th at Cleveland found five hundred carloads of equipment valued at five million dollars filling the main floor, basement and west wing of the Public Auditorium and Central Armory, waiting the inspection of visitors at the twenty-sixth annual convention of the American Road Builders Association and the thirteenth Road Show.

Increasing completeness of the Road Show exhibits was one of the most important reasons for growth in attendance, which reached 22,000 this year. Road men found that more efficiently than ever before they could size up practically all equipment offered for their work.

Of great importance to manufacturers is the increasing number of foreign delegates in attendance. This year twenty-six countries were represented with

View of the West Wing 1929 Road Show.

some sixty delegates from Central and South America.

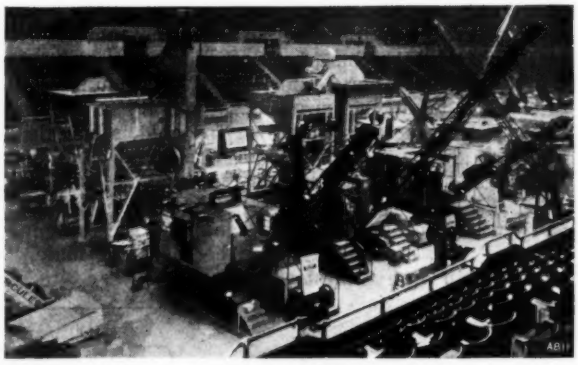
Monday, January 14th, was Exposition Day, and the entire day was given over to visiting the various exhibits in the Public Auditorium and Central Armory.

On Tuesday, January 15th, City Officials' Day, the formal opening of the Convention took place at the Theatre of the Public Auditorium. The day was devoted to business meetings and reports of committees. And in the evening the Road Builders' Entertainment also took place at the Theatre of the Public Auditorium.

Wednesday, January 16, was Pan-American Day, and the session was presided over by Octovio Dubois, President of the National Highway Commission of Mexico, Pan-American Division, together with Thomas H. McDonald, Chief Bureau of Public Roads, United States Department of Agriculture, Washington, D. C. Of particular interest was the talk on "Plans of Construction of Central Highway, Cuba" given by M. A. Coroalles, Construction Engineer for the Cuban Department of Public Works, Havana, Cuba.

On Wednesday evening occurred the Road Builders' banquet at the Grand Ball room of the Hollenden Hotel.

Thursday was County Highway Officials' Day, and this session was opened with an address by Thomas J. Wasser, President of the County Highway Officials Division, and Supervising Engineer, Hudson County of Jersey City, New Jersey. An interesting talk was



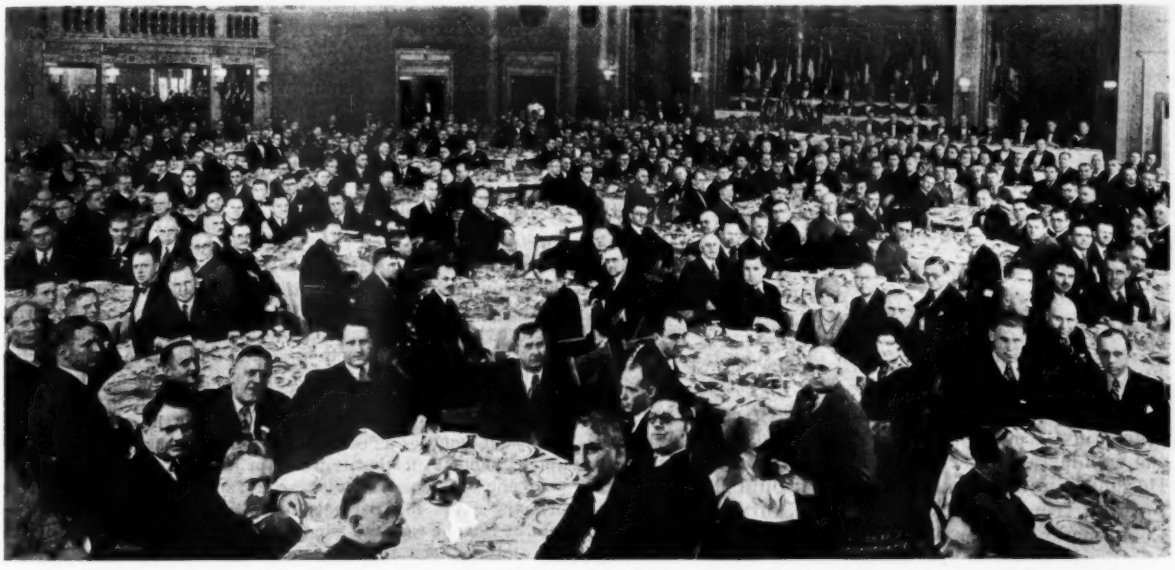
View of Auditorium 1929 Road Show.

given by F. E. Schnepfe, Highway Engineering Bureau, Washington, D. C., on "Procedure for Making an Economic Survey and Plan for County Highway Development."

Friday, January 18, was another Exposition Day and marked the closing of the Road Show. Friday afternoon was held the Annual Business meeting of the American Road Builders' Association.

Crushed Stone — January 21st to 24th Inclusive

The twelfth annual convention of the National Crushed Stone Association held at the Hollenden Hotel, Cleveland, January 21st to 24th inclusive, was well attended by quarry men from all parts of the country. Monday morning meetings were devoted to welcoming delegates and reports of committees and directors. In the afternoon the principal address on "The New Testing Laboratory and Some Test Results" was given by A. T. Goldbeck, Director, Bureau of Engineering, National Crushed Stone Association. Formal opening of the Manufacturers Division Exposition of Quarry Equipment, Machinery and Supplies took place Monday evening.



Annual Banquet, 1929 American Road Builders' Association, Hotel Hollenden, Cleveland, Ohio, January 16, 1929.

Tuesday morning sessions included addresses on: "A Study of Quarry Operating Costs" by J. R. Thoenen, Mining Engineer, Bureau of Mines, United States Department of Commerce, Washington, D. C.; "Crushed Stone for Sewage Trickling Filters" by George B. Gascoigne, Consulting Sanitary Engineer, Cleveland, Ohio; "Vibrations and Their Legal Consequences" by Harold Williams, Jr., Esquire, Member of the Boston Bar; "Transportation — Present and Future" by W. J. McGarry, Manager, Car Service Division, American Railway Association, Washington, D. C.; "The Next Six Months" by Hon. George E. MacIlwain, Business Economist, Lecturer, Author and Analyst.

Tuesday afternoon, at the meeting of Operating Men, Superintendents and Manufacturers, W. E. Farrell, President of the Easton Car Company talked on "Harrogate Holiday" and "Truck Transport" with motion pictures; P. H. Jacoby, Superintendent, White Haven Plant, The General Crushed Stone Company, talked on "The Effect of an Accident Prevention Program on Production"; George B. Holderer, Mining Engineer, Air Reduction Company, New York City, talked on "LOX Plant at Michigan Limestone and Chemical Company" with motion pictures; F. H. Edwards, General Superintendent, The Connecticut Quarries Co., Inc., New Haven, Connecticut, talked on "Why We Use Three Different Methods of Drilling and Blasting Trap Rock."

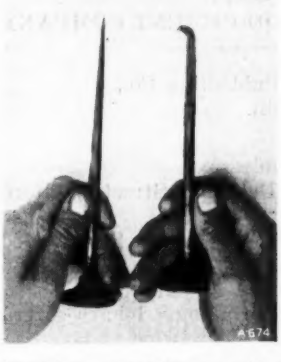
In the Highway and Sales Conference, also held Tuesday afternoon, interesting talks and discussions took place along lines of interest to this division.

Wednesday morning brought addresses on: "Various Types of Stone Storage Structures" by M. E. Crosby, Chief Engineer, Burrell Engineering & Construction Co., Chicago, Illinois; "Research and Industry" by Charles M. Upham, late Director, Highway Research Board, Consulting Highway Engineer, and Business Director American Road Builders' Association, Washington, D. C.; "The Use of Traffic Studies in Planning Highway Systems" by Dr. J. Gordon McKay, formerly Chief, Division of Highway Economics, United States Bureau of Public Roads, now Director, Cleveland Highway Research Bureau, Cleveland, Ohio; "Humanity and the Machine" by Dr. Dexter S. Kimball, Dean of Engineering, Cornell University, Ithaca, New York.

On Wednesday afternoon the Accident Prevention Conference was held with E. E. Evans of the Whitehouse Stone Company presiding. Afternoon meetings also included the annual meeting of the National Agstone Association with J. C. King, President, presiding.

Wednesday evening marked the annual banquet and Thursday was devoted to meetings of the local associations, Manufacturers Division and Board of Directors.

Handy Homemade Repair Tools



Very often a few simple homemade tools are more handy and practical than anything money can buy as a finished product. Two old tractor engine valves can be readily made into a hook and point which are in a class by themselves for homemade devices. The steel in the stems of such valves is tough and strong, though easily drawn and worked, and the seats make ideal handles. Hardly an odd emergency job will show up around the machine but what these little tools will be in use most of the time on it. — *Frank W. Bentley, Jr.*

"Why do you employ such dumb looking salesmen?"

"Well, it makes the customers feel that they cannot help but get the best of the bargain."

— *Pitt Panther.*

From THE MAIL BAG

713-714 Kahl Building
Davenport, Iowa

The Excavating Engineer
Publishing Department
South Milwaukee, Wisconsin

Attention: Editor

Dear Sir:

Your monthly publication of *The Excavating Engineer* just received. We look forward each month to the wonderful information in this magazine. In your December number on page 469 you published a letter received from Mr. G. H. Cook in Kantni, India. Mr. Cook made inquiry with reference to your August publication giving particulars as to the products of the Waukesha Lime & Stone Company. This was very interesting to us. Your suggestion calling attention to Excavating Engineer readers who have similar problems and may find it of interest to correspond with Mr. Cook, is a very opportune remark on your part. In checking the chemical analysis of the limestone given by Mr. Cook we find our materials to contain considerable higher calcium oxide and carbon dioxide contents.

We produce and furnish one of the highest calcite limestones, which is used mainly in grey iron and steel foundries for fluxing purposes.

Your publication for May 1928 gives a very good outline and illustrated photographs of the Dewey Portland Cement Company of our City. It so happens that their quarry adjoins our property and is located just a few blocks from our quarry.

If you are interested and desire any further information we will certainly be pleased to hear from you.

Yours truly,

FAB:MS LINWOOD CEMENT COMPANY.

The Excavating Engineer Publishing Co.,
South Milwaukee, Wisconsin.

Dear Sirs:

Please note change of address.

Old: L. C. Wheeler, 49 Dearborn Street, Medford, Massachusetts.

New: L. C. Wheeler, 36 A Dearborn Street, Medford, Massachusetts.

I have not received a copy for either October or November. Please send them along. I have several other magazines but I think I get twice as much for my money in *The Excavating Enginer.*

Let us hear from New England once in a while though. Yours respectfully,

(Signed) L. C. WHEELER.

Editor's Note: We have, of course, changed Mr. Wheeler's address as requested and sent him the numbers of *The Excavating Engineer* which he evidently missed in moving. We are also making a special effort to cover the New England territory with our Shots in future issues.

Further Forecasts of Excavation for Road Work in 1929

In our January issue we had the pleasure of presenting to our readers through the co-operation of the various highway departments forecasts for road building during 1929. From time to time during the year, additional forecasts will be made. In this issue we present the following:

California

A budget contemplating total highway expenditures during the biennium for 1929-1931 of $54,923,490 has been prepared by the State Department of Public Works and the California Highway Commission. This is allocated to maintenance, new construction, reconstruction, field and office engineering, rights-of-way, reserves for contingencies and general administration. These funds are apportioned in accordance with the terms of the Breed bill between the northern and southern groups of counties as established in that measure. Under this apportionment northern group primary roads received 54.7 per cent of 75 per cent of such funds and southern group primary roads 45.3 per cent of 75 per cent. Twenty-five per cent of the one-cent tax fund is shared equally between northern and southern group secondary roads.

Louisiana

1929 road program for Louisiana has not yet been completed. This state expects, however, to spend approximately ten million dollars per year on paving for the next four years.

Nevada

Proposed new construction in Nevada for 1929 involves grading of 94.73 miles at an approximate cost of $452,050. Of this mileage 59.73 miles will receive Federal Aid, the total cost of this portion being $352,050. 35 miles will be constructed by the State without Federal participation at a cost of $100,000. Reconstruction for 1929 will improve 95.06 miles of road at an approximate cost of $447,000, all of which includes Federal Aid funds. 187.5 miles of roadway will receive bituminous treatment of gravel surface at an approximate cost of $307,000. This treatment consists of applying asphaltic oil to the gravel surface roadway, using the mixed or turn-over method. The total expenditure for construction and reconstruction for 1929 amounts to $1,206,050. It is estimated that the new construction will require 475,000 cubic yards of excavation of which about 25 per cent will be suitable for shovel operation. Reconstruction operations will require approximately 103,000 cubic yards of excavation, of which 10 per cent will probably be suitable for shovel work. In addition to the program above, 307,000 cubic yards of work contracted in 1928 will be carried over into 1929 at a total cost of $89,000. Nevada does not contemplate construction of any hard surface roads during 1929.

British Columbia

It is reported that the Government of British Columbia will shortly borrow $4,000,000 to be devoted to the construction of new highways and the repair of existing roads in the Province, in 1929. It is understood that the new construction will be confined largely to the Frazer River Valley, in order to give the farmers in that large agricultural district easier access to the commercial center of the Province, and also to divert a substantial amount of automobile traffic from American cities near the border on Sundays and holidays. It is also anticipated that the improved highway will induce American tourists to penetrate further into the Province of British Columbia. According to reports, nothing will be done toward the completion of the large construction projects initiated last year, viz., the highway through North Thompson Canyon to Jasper and the Big Bend of the Columbia River, and westward from Jasper to Prince Rupert; also the west coast highway on Vancouver Island. Road construction in British Columbia is financed principally by receipts from the tax on gasoline, which at present is 3 cents per imperial gallon.

EQUIPMENT YOU OUGHT TO KNOW ABOUT

New Cincinnati Gasoline Locomotives Featured at Cleveland

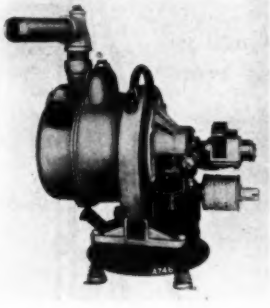
In the exhibit of the *Cincinnati Car Company of Cincinnati, Ohio,* at the Road Show of the American Road Builders Association at Cleveland were two of the new popular-size, gasoline-powered locomotives of particular interest to dirt movers. With more than 30 years' experience in the building of freight and passenger rolling equipment the Cincinnati Car Company have wide experience and large engineering and manufacturing facilities for marketing of a complete line of industrial locomotives in gasoline, gasoline-electric, Diesel, electric trolley and storage battery types, known as "the Cincinnati line."

The locomotives will be furnished in a variety of sizes from small 2 and 3 ton units up to 50 ton or larger, and in various track gauges, affording equipment suitable for handling either small or large industrial cars in all kinds of service. This company has been building electric trolley-type locomotives of various sizes for years and many of the proven features of design in this type are incorporated into the additional types, particularly the gas-electric. Ruggedness, ample power, simplicity and accessibility are the prime features sought throughout all of the different types and models.

H. R. Sykes, who is one of the pioneers in the development, manufacture and sale of industrial locomotives, and who is well known to many of the locomotive-using public, will be in charge of Sales and Service of the Locomotive Division.

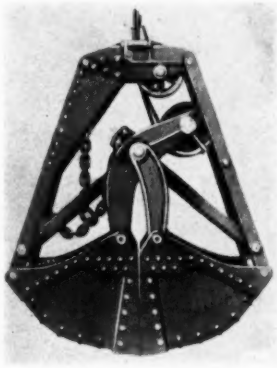
Homelite Shows New Portable Self-Priming Pump at Road Show

Featured in the exhibit of the *Homelite Corporation (Port Chester, New York)* at the Road Show was the new Homelite portable self-priming centrifugal pump which embodies new features, making it a two-purpose pump suitable for pumping volume or seepage. This self-priming pump is operated by the Homelite air-cooled gasoline engine. Spring feet on the base take up the vibration of the engine and eliminate skids or other foundations. The complete unit weighs but 75 pounds and a conveniently located handle makes it readily portable. There are only five moving parts. In spite of the small size and light weight of this unit, it is rated to pump 6,000 gallons per hour. Inasmuch as the pump is self-priming, no foot valve is required on the suction line. The Homelite gasoline engine is the same which has been on the market for several years. Oversize ball bearings are used on the main shaft and ignition current is supplied by a high tension water-proof magneto.



Improved Clamshell Bucket Exhibited by the Lakewood Engineering Company at Road Show

The open reach of the jaws of the new Lakewood Bucket is claimed to average 25 per cent more than the majority of the clamshells on the market today, which results in a directly proportionate increase in yardage of material handled for the same bucket weight. Another feature advertised is the concentration of closing power near the end of the stroke so that the shells are forced to stay down in the material until they are fully closed. At the head of the new bucket is one piece of cast steel. It has wedge sockets for dead-ending both cables. The closing leaves the head on the center line, thus insuring the bucket's carrying level and digging evenly. A guide sheave and three hardened rollers insure a fair lead of cable, while reaving is straight with no S bends. All moving parts are bushed with heat-treated, glass-hard, alloy steel pins working in bushings of chrome nickel, heat-treated steel that are several points harder than the pins so that wear will be confined to the pins, which may be replaced without dismantling the bucket or removing it from service. The power arm sheaves are mounted on double row of ball bearings thoroughly enclosed and protected by water-tight seals. The shells are constructed of steel plate and have cast steel hinges. The cutting edges are .50 carbon steel with hardened edges. The capacity of the buckets range from ½ yard to 2 yards, and the weight from 2,350 to 5000 pounds. These new clamshell buckets are manufactured by *The Lakewood Engineering Company of Cleveland, Ohio,* and were exhibited in Booth 29 at the Road Show.



Autocar Features Concrete Carrying Truck at Road Show

One of the most significant developments in road-building machinery during 1928 has been the perfection of the revolv-

(Continued on Page 83.)

SHOTS FROM THE FIRING LINE

Alaska

BY R. FRANZ

Through the courtesy of D. R. Kyes, Superintendent of the Walkers Fork Gold Corporation, Dawson, Alaska, we have obtained the above picture showing their Bucyrus 50-B

steam dragline loading the gravel from the creek bed. In the picture D. R. Kyes, Superintendent, is at the throttle, the engineer of the machine is sitting and the fireman standing behind them. Mr. Kyes makes a note on the back of the picture which says "Right machine in the right place."

New England Notes

BY J. C. ALEXANDER

The recent banquet of the New England Roadbuilders Association was a great success. The banquet itself, as well as the ensuing festivities, were enjoyed by all.

This winter seems to have been unusually quiet with the roadbuilders. There are but few heavy grading jobs being done and very little work is being let for the Spring.

The second section in the rebuilding of the Newburyport Turnpike, the famous trail from Boston to Maine, has been let to Warren Brothers of Boston. Work will be started as soon as weather permits.

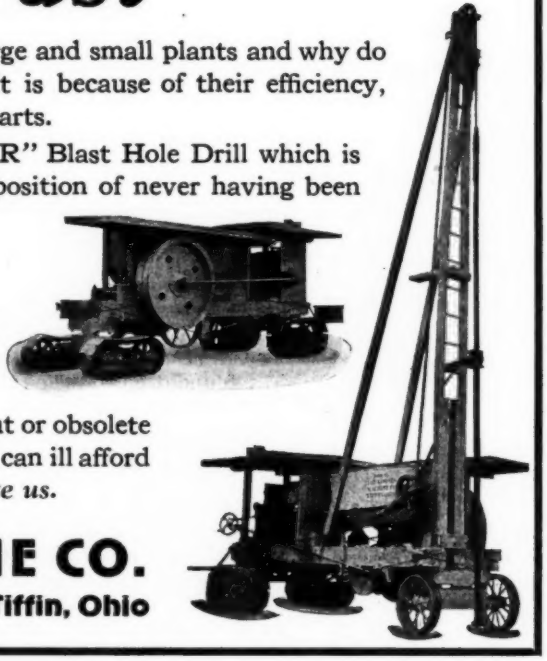
Reports from the three biggest jobs in New England show quite satisfactory progress. The New England Power Company's project at Barnet, Vermont, on the Connecticut River has about 1000 men employed. It is expected that three or four thousand men will be employed by the middle of the summer. Winston & Company's job at Westfield, Massachusetts, is getting lined up rapidly and will go great guns in the Spring. The other job which is a power project at Bingham, Maine, is likewise in the lining up stage.

Louis Hayes is operating an Erie "B-2" for M. A. Gammino Construction Co. on their Avon Mountain job in Connecticut.

SIMPLE – RUGGED – RELIABLE
and Fast

Why are there more "Clippers" in use in large and small plants and why do they predominate in the Blast Hole Field? It is because of their efficiency, simplicity and because they have few wearing parts.

Now comes the Improved Type "CLIPPER" Blast Hole Drill which is better made than ever and holds the unique position of never having been replaced, as far as we know, by any type drill.



Talk to users of "Clippers", especially those who have used all sorts of drilling devices and let them tell you of the low upkeep costs, low delay losses and CONSTANT PRODUCTION RECORD FOOTAGE.

It might pay you well to displace the worn-out or obsolete equipment, or if considering additional drills you can ill afford not to investigate the famous "Clippers". *Write us.*

THE LOOMIS MACHINE CO.

(Established 1842) **K Street, Tiffin, Ohio**

SHOTS FROM THE FIRING LINE — Continued

Louis says that it is a pleasure to run a "B-2" after having been on a gas machine for six months.

F. E. Bailey is operating a Type "A" Bucyrus-Erie for Paul Nash in Stamford, Connecticut.

Sidney Lawrence of Falmouth, Massachusetts, paid us a visit the other day. Mr. Lawrence still manages to keep going down on the Cape despite the winter weather.

New York and Vicinity

BY T. A. BURNS

We are getting fed up on our job, there is little new in this territory in the way of new work — just the same old subway jobs, tunnel, cellar, street work, etc. But, we have hope for the future in the event that some of our New York contractor friends get the England to France tunnel and use a certain make of shovel, which is nearly always used on such large projects, we will have at last a chance to go abroad.

Oh! yes, and the tubes under the Strait of Gibraltar. Gee, maybe we can go hunting lions in Africa.

Three Musketeers or Buccaneers were in to see us the other day, B. A. McMillen, J. Sculley, E. E. Hewitt. They were in town with a season's wages and plenty of time and inclination.

Jim Fallen, that is Jim, Sr. — we want to be sure you get this right because it is an oddity — told us the other day that he has not taken a drink in two years and never eats lunch. **In fact, he turned down an offer of both.** It will be tough on us if the fellows who audit our expense accounts take any stock in this.

Well, anyway, we may decide to quit soon and look for a job running a shovel with the five-day week coming along in New York. With shovels equipped with dipper trips and shaking grates, making it unnecessary for runners to speak to firemen and the firemen well fed and well paid, high batting the runner anyway, running should be a good job.

Canada

Toronto and Vicinity

BY C. E. ENGLAND

The Dufferin Construction Co., Ltd., are doing the excavation on the second contract let for excavation and foundations on the new T. Eaton Building, Toronto. Thomson Bros., Ltd., are putting in the foundations. There is quite a large yardage of both excavation and concrete.

John Gunn & Sons, Ltd., are making good progress on their contract for manufacturing plant which they are erecting at Leaside, Ontario.

General civic elections in the cities and towns are over now for the year and the new councils are starting to take over the reigns. From all reports there is to be considerable construction work going on in the Municipalities during 1929.

Montreal and Vicinity

BY J. M. WARD

Prospects look bright for another busy season. Several large projects are in the making and may be ready in a comparatively short time.

Kendall Brothers, Montreal, are keeping very busy, and have five shovels working.

Dan Verochio has two big excavating jobs for the Sun Life Assurance Company.

You don't need an umbrella when you look up at a WILLIAMS—

You don't see any dribble of water or mud through the lips of a WILLIAMS Bucket. Even after years of hard digging *the scoops close up tight.*

For instance, the president of one large dredging company writes:

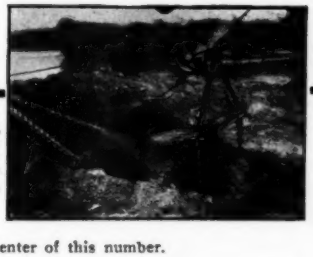
"With our WILLIAMS Bucket we are lifting material 15 feet out of the water and the bucket *does not lose a pound*". (Name on request.)

The full width main hinge keeps the scoops of the WILLIAMS Bucket perfectly aligned. And this big one-piece hinge bearing takes the place of three or more moving parts.

Write for our Bucket Book describing in detail the many unique features of construction that make WILLIAMS the choice of men who know buckets.

G. H. WILLIAMS COMPANY
603 Haybarger Lane, Erie, Pa.
BRANCH OFFICES:
New York Pittsburgh Chicago

WILLIAMS
FAST-DIGGING BUCKETS



Write us for Bulletin DS-1, giving full description of the WILLIAMS "Double-Arch" Dragline — the bucket that won't draw in at the sides.

SHOTS FROM THE FIRING LINE — Continued

The big Beauharnois Power Project is to have a hearing before the Federal Parliament Committee on January 15, 1929. It is anticipated that this work will be started this year.

The Quebec Provincial Government has a $17,000,000 program on roads, and repairs to existing roads.

British Columbia Notes

The McKenzie Barge and Derrick Company, Ltd., Vancouver, British Columbia, has secured a contract for preliminary filling operations for the water level roadway. This work will be carried out for the Vancouver Harbor Board, same city, at an estimated cost of $70,000. The fill will require about 96,800 cubic yards of material and about 4,300 yards of riprap. The contract also calls for the installation of 4,500 lineal feet of concrete culvert, 4,500 lineal feet of 18-inch corrugated pipe culvert and 90 feet of 12-inch pipe.

Saskatchewan

Mr. Mamozas, Prince Albert, Saskatchewan, has been awarded contract for gravelling road from Insenger South, 6 miles, $16,000.

Province of New Brunswick

New Brunswick is one of the few provinces of Canada which has not increased the gasoline tax to 5 cents per gallon; New Brunswick's tax remaining at 3 cents per gallon for the present year. The fees from motor vehicle licenses and from the gasoline tax are used as sinking fund to meet highway bonds when they come due and to pay interest on the bonds. Any surplus is applied directly to road construction. Vehicle license receipts for the first eleven months of the fiscal year amounted to $731,139 and the gasoline tax has returned $217,763 for the same period.

Indiana Notes

BY J. I. MORAVEC

Floyd Heaton, operator for the Central Indiana Coal Company at their Allendale mine, recently turned out a record run that he can well be proud of. Mr. Heaton with a Bucyrus-Erie 75-B electric loaded out in 8 hours 2,335 tons of coal into the Sanford-Day dump cars. Allowing 50 pounds to the cubic foot, this is 3,460 cubic yards. By the Service Recorder

the shovel was actually swinging 89 per cent of the time of 7 hours 7 minutes, the balance of the time being required for changing trains under the shovel. Allowing 3¼ yards to the dipper this means that 1,064 dipperfuls were loaded in actual operating time of 427 minutes, which shows a performance of 2½ dipperfuls per minute.

Pennsylvania Notes

Lee Yagle, well-known shovel owner and operator, lost his life in an automobile accident December 26th. Mr. Yagle was returning home from spending the holidays in Oakland, Maryland, and on the icy mountain between Chambersburg and McConnellsburg his car skidded into a quarry. Mr. Yagle was instantly killed in the crash. Just before his death he was operating his Erie steam shovel between Delaware Water Gap and Stroudsburg on road work.

Detroit and Vicinity

BY S. A. HEALEY

The M. Sulivan Dredging Company have a subcontract on earth moving job under the Newton Baxter Company of Toledo, Ohio. They are using their Bucyrus 50-B and also one of S. A. Healy's Bucyrus Class-14 machines.

MOON-LIGHT

THE steady, reliable service which you receive from a MOON Lighting Plant makes it the ideal equipment for your night work. There is a size and style for every requirement.

MOON Turbo Generators 1 to 4 KW.

Write for Bulletin E-1 showing the entire MOON line.

THE MOON MANUFACTURING CO.
108–128 No. Jefferson Street, CHICAGO

GREDAG
REG. U.S. PAT. OFF.
LUBRICANTS
FOR WIRE ROPES

Gredag No. 16 often trebles or quadruples the life of a cable

Contains Acheson Electric Furnace Graphite, 99.9% pure, which penetrates between the strands and protects against damage by rubbing, squeezing, bending or stretching.

Seals out dirt and water.
Prevents corrosion.

Use the same grade for your open gears.
Other grades suitable for every purpose.

ACHESON GRAPHITE CORPORATION
NIAGARA FALLS, NEW YORK

Roebling

"Blue Center" Steel Wire Rope

The Rope That Lasts

John A. Roebling's Sons Company
Trenton, New Jersey

In writing to John A. Roebling's Sons Co. please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Among the Detroit visitors at the National Sand & Gravel Association Convention in Cleveland were Fred Grant of the American Aggregates Corporation, L. E. Williams of the C. N. Ray Corporation and Fred Jones of the Jones Contracting Company. Dewey Battjes of Grand Rapids was also in attendance.

Mr. Charles Killen, manager of the Lima Stone Company, was confined to the hospital in Lima through the month of December. We are glad to be able to report that Mr. Killen is rapidly recovering from this recent illness.

S. A. Healy has completed his sections of the Junction Avenue Sewer which was done in tunnel. This job consists of approximately 5000 feet of 11-foot finished diameter monolithic concrete sewer, and was handled from three shafts. Materials on this job were handled with their Bucyrus-Erie 1030 Crane as pictured herewith. This crane operated 24 hours a day on three shifts for five months without losing any time of machine delays. This company have also recently completed their portion of the Rivard Sewer. One of their Bucyrus Class-14's made exceptional records on this job, the work involving from a 30 to 36-foot cut throughout and running from approximately 25 to 28 yards per foot. On one section of 5200 feet they averaged 100 feet for each 20-hour day. On a second section of approximately 5000 feet they averaged 125 feet, and a third section of approximately 4000 feet, the average was increased to 150 feet per 20-hour day. This job also included approximately 1600 feet of tunnel.

The Detroit Drainage Construction Company are using J. Rossi & Son's Bucyrus-Erie 50-B dragline on an open-cut job in the western part of the city.

Phelps & Son have awarded a subcontract to L. P. Johnson, covering the excavation on the Dearborn Sewer job which they were recently awarded.

W. E. Lennane expect to have the Gratiot Avenue grade separation bridge completed within the next 30 days. This work has been under the direct supervision of Bill McGuire who has made very rapid progress. Most of the excavation was handled with their Bucyrus 50-B shovel.

O. E. Gooding, manager of the Standard Gravel Company, New Hudson plant, was a recent caller at the Detroit office.

Les Lauver and Nick Merinick are dividing time on S. A. Healy's Bucyrus Class-14 at Toledo.

Keeps the job out of the "red"

OFTEN it's the cost of preparation, handling emergency work under construction, and cleaning up after completion that eats up profits of a contract.

The Buckeye *Utility* Crane has assisted many contractors to keep jobs out of the "red". Its flexibility adapts it to a great variety of service for which heavier, more expensive and less suitable equipment is not economical.

It excavates, lifts and shifts miscellaneous materials and smaller construction units, lays pipe, backfills, and helps out in many profit-losing operations that develop unexpectedly.

The chances of all of your jobs being profitable are greatly enhanced by having one of these rugged little time and labor-saving Cranes on hand as an all-around assistant. You'll find plenty of use for it every day in the year, either as a Backfiller, Clamshell, Crane, Ditcher or Dragline. It is fast — "on its feet" and in every operating action. You can well afford it at its extremely low price of $4,750 f. o. b. factory, without bucket or cab.

Our Crane Bulletin gives complete construction and performance details. Write for your copy.

The Buckeye Traction Ditcher Co.
FINDLAY, OHIO

There's a Buckeye Sales and Service Office Near You

for over thirty years **Buckeye**

In writing to The Buckeye Traction Ditcher Co. please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Birmingham and Vicinity

BY W. W. WHORLEY

Dewitt Van Diver, who has been handling a B-2 for the Bessemer Engineering Company, paid us a visit recently.

Jack Castleberry, who is with Reid & Lowe of this city, states that his 41-B is ready to start as soon as work opens up.

Fred Bradshaw sent us a New Year's card from Bronx, New York City. He reports that he is the proud father of a baby girl. Congratulations, Brad.

J. T. (Jess) Moses dropped in to see us recently and reported that a new car had been stolen from him. Fortunately the loss was covered by insurance.

Archie Nairn writes that he is now sojourning at Jemez Springs, New Mexico.

J. D. Kennedy is handling a GA-2 clamshell for the West Construction Company at Birmingham, Alabama.

Work continues to be very quiet for shovelmen in the Birmingham District, although there are indications that the coming year may develop the usual amount of activity.

North Carolina Notes

BY CHESTER COULTER

BENJAMIN HURT HARDAWAY, SR.

Col. B. H. Hardaway, Sr., president of the Hardaway Contracting Company, Charlotte, North Carolina, passed away on December 13th last. He was 61 years old and a native of Bullock County, Alabama. Col. Hardaway had been in the contracting business for a number of years and was well known in the general contractors' field. His passing will be noted with regret by his many friends numbered among our readers.

St. Louis Items

BY A. J. KOENIG

Plans for a direct line from St. Louis to Memphis, Tennessee, by the Cotton Belt, through the purchase of short lines and the building of connecting tracks at an investment of nearly $2,000,000, has been announced by company officials. Purchase of the Gideon & North Island Railroad, the Blytheville, Leachville & Arkansas Southern Railroad, the Deering & Southwestern Railroad, as well as the building of 20 miles of a new line between Deering and Gideon, Missouri, and 11 miles of track from Hornersville, Missouri, to Leachville, Arkansas, would assure a direct line from Memphis to St. Louis. Thirty miles of track will be built from a point on the Blytheville, Leachville & Southern to Briark, Arkansas, which is the west end of the Harahan bridge.

A. Guthrie & Co., Inc., was awarded contract for the construction of the double track and track raising on the Missouri Pacific System from Bald Knob to Newport, Arkansas. Camps will be opened at Bradford, Olyphant and Grand Glaise. One million yards of dirt will be moved and will take about one year to complete the job. A. D. Holman of A. Guthrie & Co. will be the engineer in charge.

Work will start soon on 1,000,000 yards of levee work in the St. Francis Levee District, extending 11 miles from a point 6 miles northeast of Turrell, Arkansas. Lowrence Bros. Co. of Memphis were awarded 490,000 yards and the Coastal Construction Co. were awarded 710,000 yards. This work must be completed by December 31, 1929.

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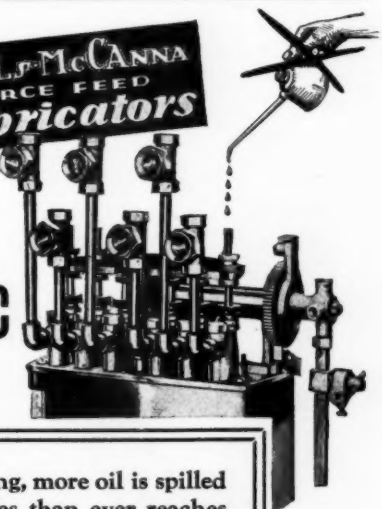

With hand oiling, more oil is spilled around oil holes than ever reaches the bearings.

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SHOTS FROM THE FIRING LINE — Continued

Rogers Brothers of Memphis, Tennessee, have started work on the track raising of the Memphis Division of the Missouri Pacific Railroad through the White River bottoms at Worden, Arkansas.

The Cane Belt Railroad was granted permission to build 35 miles of new road from Lane City to Magnet, Texas. This line is a subsidiary of the Santa Fe Railroad.

Rouse Construction Co. has contract from the Missouri State Highway Commission for 9¼ miles of concrete paving on Highway No. 61 near Cape Girardeau.

The Concord Construction Co., St. Louis, has contract for grading and paving Fourth Street in Venice, Illinois.

J. A. Tobin was awarded contract for grading and paving the Schwartz-Probst Road in Kansas City, Kansas.

Permission to extend their lines from Allerton, Iowa, to Birmingham, Missouri, a distance of 133 miles, has been asked of the Interstate Commerce Commission by the St. Paul & Kansas City Short Lines and the Chicago, Rock Island & Pacific Railways. Trackage rights would be included for fifty-three miles of the proposed extension, while eighty-five miles would be newly constructed from Coburn to Birmingham, Missouri.

The State Public Service Commission granted a permit to the West Missouri Power & Light Company to construct a dam and hydro-electric plant on the Osage River at Osceola, St. Clair County, Missouri. Estimated cost of the dam and plant is $356,900, which will be expended out of the assets of the company.

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THERE are many different sources from which you can secure the ordinary supplies for your shovel, dragline or crane. It is obvious, however, that nowhere else can you find the same intimate knowledge of your equipment and the same interest in its successful performance that you can find in the organization of the manufacturer of the machine.

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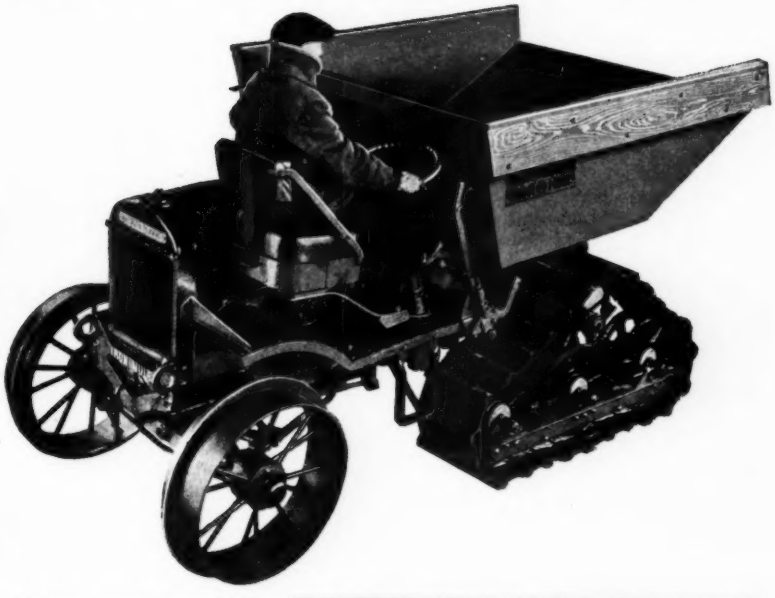
Now a Super "IRON MULE"

4 GOOD YARDS A LOAD



HERE'S the Super "Iron Mule," a larger, more powerful short haul dirt mover that will give even bigger profits than the now famous 2-yard "Iron Mule." It will keep the bigger shovels working at maximum capacity.

This is not an experiment, it's the result of five years' actual experience in design, manufacture and observation of "Iron Mule" equipment in actual use. Here are a few of the major factors that make the Super "Iron Mule" the greatest profit-maker dirt-moving contractors have ever put on the job. It's a complete tractor dump, a dump body of over 4-yard capacity (with crowned load) mounted on the sturdy 10-20 McCormick-Deering Tractor which is equipped with crawler tracks of special design. These will traction this giant dirt mover over roughest going — take it, without hesitation, up a 20 per cent grade with its huge 4-yard load and into places where trucks and teams can't get. The power hoist gives positive dumping — up hill or down and easily dumps full load in 4 to 5 seconds. Body is built for bulldozing. It's exceptionally wide — even the biggest shovels won't spill over the sides.

Driver can spot shovel or dragline instantly and run up to the edge of fill easily and quickly because he is always facing load.

See "Iron Mules" in action. Figure the cost and profit-per-load against any equipment you've ever used and you'll be overwhelmingly convinced that nothing can lick "Iron Mules" for short-haul dirt moving. Write for illustrated broadside today. Get information, too, about the 2-yard "Iron Mule" and the complete line of Hughes-Keenan's famous Dump Bodies.

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In writing to Hughes-Keenan Company please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Three Memphis firms were among the low bidders for approximately 1,250,000 yards of levee construction. The Canal Construction Co. was low on Project No. 35 for 430,000 yards; on Project No. 36, McWilliams Company, Inc., was low bidder, this project embraces 255,000 yards; Lorance Brothers & Co. was low bidder on Projects No. 37 and 38 totalling 580,000 yards. Construction will be in upper Yazoo Levee District near Lakeview, Mississippi.

Work on the levee at Hickman, Kentucky, is going forward at a rapid rate. W. S. Bibb, subcontractor for the Fred C. Morgan Company, on Contract No. 2, who has contract to move 270,000 yards of earth on Mile No. 5, where a new loop is being built, has made fine progress, using tractors and draglines. A. A. Davis is making good progress on Contract No. 4, a new loop at Mile No. 7, and will finish at an early date, all excepting the topping. The topping will be done with his big machine from Mile No. 5. He also has contract for a new loop at Mile No. 10 and Mile No. 11.

Bids have been received by the Missouri Pacific Railroad for the construction of 5.8 miles of new railroad to be constructed out of Illmo, Missouri, to connect with the old Cape Girardeau & Northern at a point just south of Cape Girardeau. The Cape Girardeau & Northern into and through Cape Girardeau, including the yard and freight facilities, will be rehabilitated as a part of the Missouri Pacific. The work which will cost approximately $500,000 will be completed early next year. The new line will be operated as a part of the Illinois Division.

Wisconsin Notes

BY E. P. DOYLE

A. Grabske's Erie "B" steam shovel is excavating for new three-story office building on Milwaukee Avenue, South Milwaukee, Wisconsin. Paul Riesen is the building contractor. The new building will house the Bucyrus-Erie central sales department.

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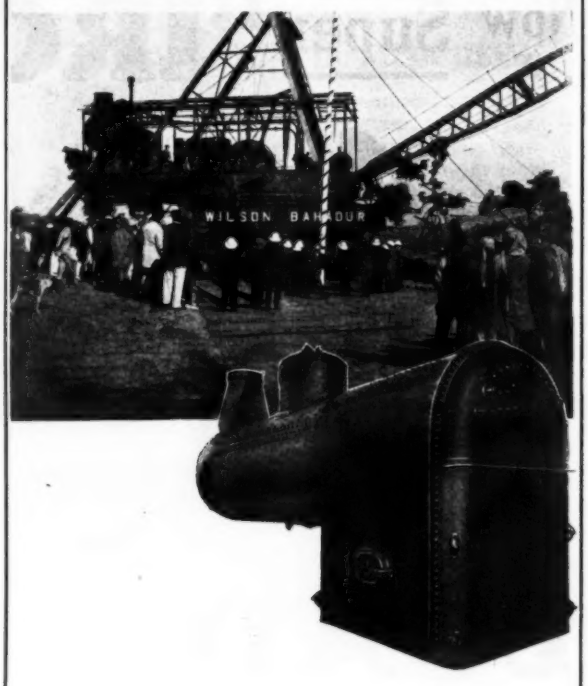

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SHOTS FROM THE FIRING LINE — Continued

California Notes

BY J. H. SACKETT

The Griffith Company, Los Angeles Railway Building, Los Angeles, were recently awarded a contract by the State of California for 5.5 miles of highway construction from Glendora to Claremont, Los Angeles County. The Griffith Construction Company's contract price for this job was $289,100; the Osborn Company of Pasadena were second low bidders, who bid $294,855.

Steele Finley of Santa Ana, California, was recently awarded contract by California Division of Highway Building, Sacramento, for 10.4 miles of grading and asphalt paving from Claremont to Cherry Avenue, Los Angeles and San Bernardino Counties. Mr. Finley's contract price for this job was $275,533; the Southwestern Paving Company who bid $293,845 were the second low bidders on this job.

The State of California Division of Highways recently awarded contract for one mile of grading from San Luis Obispo to city of Reservoir, San Luis Obispo County, to Arriss-Knapp Company of Oakland, California.

Autocar Features Concrete Carrying Truck at Road Show

(Continued from Page 71.)

ing truck body for carrying ready-mixed concrete. A most improved body of this type will be a feature of the Autocar Company's exhibit at the Convention of the American Road Builders' Association which opens in Cleveland on January 14.

The Autocar Company, motor truck manufacturers of Ardmore, Pennsylvania, selected the Good Roads-Clinton Concrete Carrier, and will accord it the place of honor in their exhibit. This will be the first time the Autocar Company has ever exhibited their chassis with such equipment.

The carrier will be mounted on a standard 5-ton, 6-cylinder, type CM Autocar chassis, having a wheelbase of 162 inches. The carrier itself is notable for its strength and simplicity. It consists of a cylindrical tank of 1½ or 3 cubic yards capacity. The inside walls and ends of the tank are smooth and entirely free of flights, supporting shafts or obstructions. After loading, it is hermetically sealed and slowly revolved until ready to discharge. The rolling action eliminates all segregation but causes more complete hydration. It is claimed that as long as three hours after loading the batch will have the same consistency it had when it left the central mixing plant. The carrier is powered by a motive unit entirely separate from the power plant of the truck. An 8 horsepower Le Roi two-cylinder motor, with throttle control, is mounted on the chassis to furnish the power for the revolving motion of the carrier.

The Autocar Trail Blazer, a 6-cylinder, 3-ton dump truck with a 114-inch wheelbase, which was the feature of the company's exhibit last year, will be exhibited again at this show, but with several improvements. The newly-developed Autocar rotary hoist permits the 3½-yard body to be raised to an angle of 60 degrees, thus facilitating the dumping of any clinging load.

The third unit in the Autocar exhibit will be a three-ton truck, varying from the Trail Blazer only in the fact that the 6-cylinder engine is located conventionally, under a hood out in front, thus increasing the wheelbase from 114 inches to 158 inches. It will be equipped with a 3½-yard body with Wood hydraulic hoist.

Bates Tractors

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BATES 28 — Made for 8-foot Graders and equipment of similar capacity.

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What Bates Customers Say:

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The company have always been fair with us in their dealings and we recommend the tractor and the company." —A Maryland Contractor.

"We have used one of these tractors for several years. It has stood up remarkably under the overload that it has pulled all summer. We find the company renders very good service when called upon to do so."
—An Illinois Contractor.

Write for New Catalog.

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Established 1883

Pioneers in the Tractor Industry

In writing to Bates Manufacturing Co. please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

West Virginia Notes

Santa Claus was very kind to Patsy Small of Bluefield, West Virginia. His B-2 Bucyrus-Erie steam shovel was set off on his siding Christmas Eve. Mr. Small has 150,000 yards of railroad work subbed from Walton-Sudduth Company for the Virginian Railroad.

Arizona Notes

The above view in the Open Pit Mine of the United Verde Copper Company of Jerome, Arizona, shows one of the newly installed Linn Tractor-Trucks being loaded by one of their Bucyrus 50-B electric shovels. The United Verde now have five of these Linn Tractor Trucks in operation and have found them especially valuable during the late rainy season, during which time their other trucks had difficulty in obtaining traction on the muddy grades. With this new equipment they are able to haul up 20 per cent grades. Necessity for increased production at the United Verde has called for oper-

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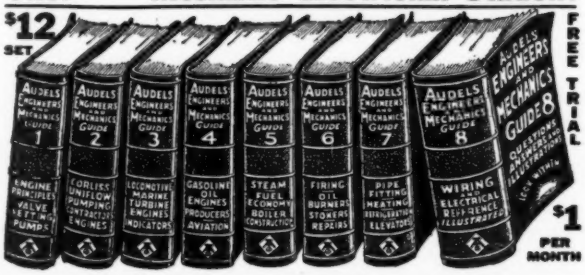

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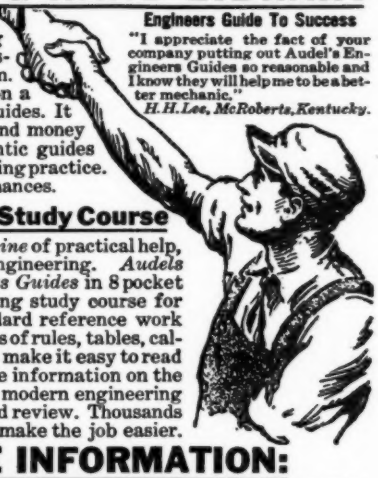

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SHOTS FROM THE FIRING LINE — Continued

ation of three shifts a day with two shovel crews working on each shift. Just behind the shovel boom in the picture you will note an Armstrong 50-B electric drill. United Verde now have three of these drills in operation.

Pacific Coast Notes

PHOTO BY HI SIBLEY

On the Los Angeles County Sewage Disposal System, Ross Construction handled Contract Number 94. The above view shows a 10-foot 6-inch semi-elliptical section looking along Machado St. Manhole Construction is taking place in the foreground, while in the background a Bucyrus steam dragline with 103-foot boom and 3½-yard bucket is opening up the ditch.

"Why," said Smith, "you don't know what hard luck is. I have always had it. When I was a kid there were so many of us that there had to be three tables at meal times, and I always sat at the third one."

"What's hard about that?" snapped his friend.

"Why," replied Smith, "it was fifteen years before I knew a chicken had anything but a neck."

Washington and Oregon Notes

Charles Gavazzi, Mayfield, Washington, is using the above 1030 Bucyrus-Erie shovel to grade logging railroad for the Andron Logging Compay, about 25 miles from Chehalis, Washington. At the point where the above picture was taken the going was very soft, but the machine had no difficulty in working without mats.

Sacreligious

An old negro preacher was making a visit to the revenue warehouse.

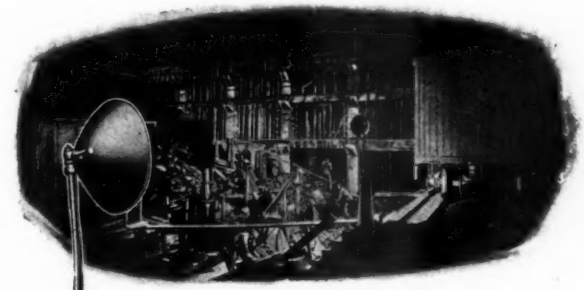
Revenue Officer: "What'll it be, Erasmus?"

Erasmus: "Ah wants some sacreligious wine."

Revenue Officer: "Some sacreligious wine? You mean sacramental wine, don't you? And what kind do you want?"

Erasmus: "Well, boss, at last Sunday's meetin' the congregation took a vote, and it was unanimous for gin."

— Pure Oil News.



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with daylight rapidity and safety

BUSINESS no longer tolerates the simple "making of hay while the sun shines" Time has become a factor of such tremendous importance that work must go on, rain or shine, and often day and night.

Contractors and engineers, relying on night work to keep up to schedule, realize the importance of supplying good light. They are the largest users of Carbic Flood Lights.

The Carbic Flood Light supplies a strong diffused light, bright but not glaring. Its simple rugged construction assures long life. Always ready for instant service, and readily portable even when charged. It costs only a few cents an hour to operate.

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And added to this speed in action are the power and strength that make Haywards equally valuable for digging or handling hard packed soil and similar materials.

Whatever your operating conditions may be there is a Hayward Bucket to fit them. Ask a Hayward Engineer.

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Hayward Buckets

TRADE NOTES

The Trackson Company, Milwaukee, Wisconsin, manufacturers of Trackson Full-Crawlers, Loaders, Shovels, Cranes, etc., announce the appointment of the following distributors: Brinker Supply Co., 905 Clark Building, Pittsburgh, Pennsylvania, and R. L. Stockard & Son, 2302 Charlotte Avenue, Nashville, Tennessee. Both of these companies are well-known tractor and equipment distributors, handling the McCormick-Deering Industrial Tractor, Trackson equipment for the McCormick-Deering, and other related lines. They will also carry a complete stock of Trackson repair and replacement parts, and will be able to give prompt service on all orders.

The consolidation of Symons Brothers Company with the Nordberg Manufacturing Company is of particular interest to those industries where crushing processes are involved. This brings together one of the leaders in the crusher field with a company long prominent in the design and building of large and highly efficient machinery particularly well known in the mining field.

For the past twenty-five years Symons Brothers Company has been engaged in the building of crushers. It has been the constant aim of this Company to improve the quality of its product and to render the crushing industry a real service by giving it machinery of improved performance. The experience gained from earlier designs later led to the Symons Horizontal Disc Crusher. Then followed the Vertical Disc Crusher. Guided by past experience and realizing the decided advantages of a machine which would incorporate the good qualities of both types of disc crushers next led to the Symons Cone Crusher. This new design marked a new process of crushing, one which met with ready favor with those engaged in crushing operations. The successful performance of this type of machine is evidenced by its use in the largest mining companies, stone and gravel plants in the United States and many foreign countries.

This consolidation permits of a more advantageous use of the exceptional manufacturing facilities of Nordberg ideally suited for crusher manufacture. The building of crushers by the Nordberg Manufacturing Company is by no means a new venture. For some time a large proportion of Symons Crushers have been produced in the Nordberg plant. Here have also been built the largest hoists, compressors and Diesel engines found in mining service. Also included among Nordberg products are the Nordberg-Butler Shovel, an air-operated machine for loading underground in drifts and tunnels, and the Track Shifter, now used for shifting track in many of the open-pit mines and large quarries. The addition of Symons Cone Crushers is, therefore, in keeping with the other products of Nordberg.

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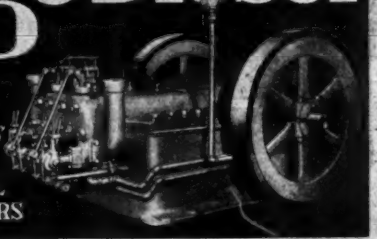
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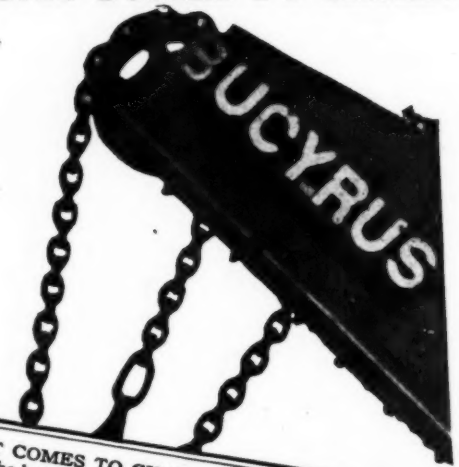
WHEN IT COMES TO CHAIN!


WHEN IT COMES TO CHAIN can you afford to buy anything but the best? The whole job shuts down when your shovel quits to put in a repair link. Remember that and order
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Taylor-Made Chain and Fittings can be purchased through your local Hardware or Mill Supply Jobber
KEEP EXTRA CHAIN ON HAND FOR EMERGENCIES
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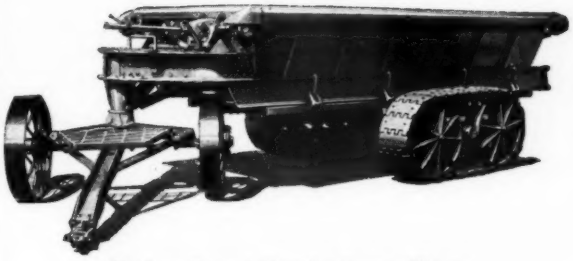
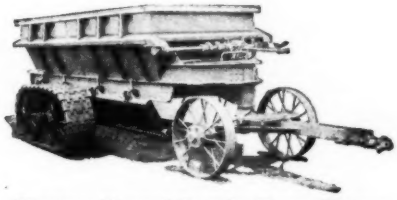
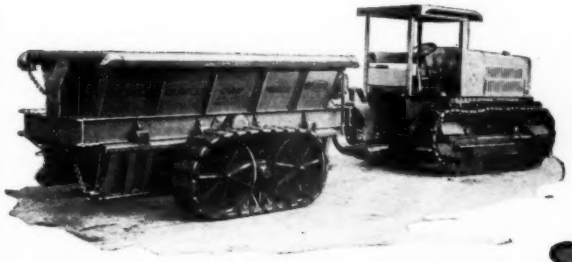


Western 7-yard Crawler Dump Wagon



Western 10-yard Crawler Dump Wagon



Western 5-yard Crawler Dump Wagon

IN 1927 the WESTERN 7-yard Crawler dump wagon was first offered to the earthmoving contractors. The use of this wagon brought about a radical change in earthmoving methods. Costs were materially lowered.

In 1920 the feats performed by this wagon more than bore out the claims of the most enthusiastic supporter.

In 1929 Western Crawler dump wagons of 5-yard, 7-yard and 10-yard capacities will still further help you to reduce the cost of earthmoving.

Write for Bulletin 29-AK for Details

Western Wheeled Scraper Co.
Aurora, Illinois, U. S. A.

WESTERN

Botts and Young's Western 7-yard Crawler Dump Wagon and Western Elevating Grader creating a lake in Kansas.

TRADE NOTES — Continued

With the Symons Brothers Co. becoming a part of the Nordberg Manufacturing Company a continuance of past policies is assured. The same representatives engaged in the sale and servicing of Symons Crushers will continue to do so in the future. The Crusher Department will be transferred to the Main Office of the Nordberg Manufacturing Company at Milwaukee, and branch offices will be continued at New York and Los Angeles.

The Koppel Industrial Car and Equipment Company of Pittsburgh, Pennsylvania, announce the appointment of H. E. Chilcoat as manager of sales for the air dump car division. Mr. Chilcoat served considerable time with the Clark Car Company, and for the past two and one-half years has been engaged in consulting commercial engineering work.

BOOK REVIEWS

We shall be glad to review such books and catalogs as are sent us

The Cleveland Tractor Company of Cleveland, Ohio, have just issued a broadside entitled "PLAY SAFE WITH OLD MAN WINTER" which illustrates and describes the use of Cletracs for snow removal. The folder presents many excellent illustrations of methods of handling snow with Cletracs. Copies may be obtained by addressing the above.

National Slag Association, 927 Leader Building, Cleveland, Ohio, have just issued a booklet (Symposium No. 7) entitled "USE OF SLAG IN CONCRETE ROADS AND PAVEMENTS." This symposium is one of a collection pertaining to the characteristics and uses of slag, and presents a complete collection of papers giving results of experience in the use of slag as an aggregate in concrete paving and other concrete work. The booklet shows that slag may be used satisfactorily for concrete aggregate where it is available.

A new and revised edition of the "BLASTER'S HANDBOOK" has just been issued by the Explosives Department of E. I. du Pont de Nemours & Company. The volume was prepared under the direction of Arthur La Motte, Manager of the Technical Section. It contains 214 pages and is of handy pocket size.

POSITIONS WANTED

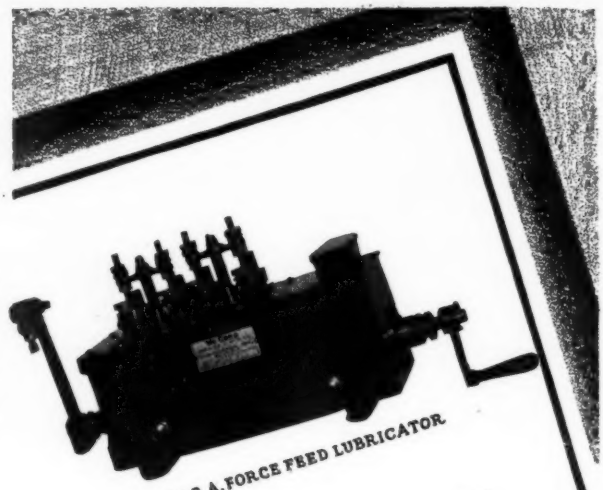
(See also pages 89 and 92)

Shovel Operator

24 years' experience as a mechanic. Three years operating Bucyrus, Erie, Thew, Osgood and so forth. Familiar with any kind of contracting work shovel and dragline operation. Long experience with Diesel engines. Located in Ohio. Address Box 280, % The Excavating Engineer, South Milwaukee, Wisconsin. 1

Shovel, Dragline and Crane Operator

15 years' experience on all makes of excavators — shovel, dragline, crane, pull shovels, railroad and revolving shovels. Experienced in all kinds of work. Have always done own repair work. Good references. Located in Ohio. Address Box 279, % The Excavating Engineer, South Milwaukee, Wis. 1



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